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FROM THE

UNITED STATES GOVERNMENT

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ANNUAL REPORT

OF THE

LIGHT-HOUSE BOARD

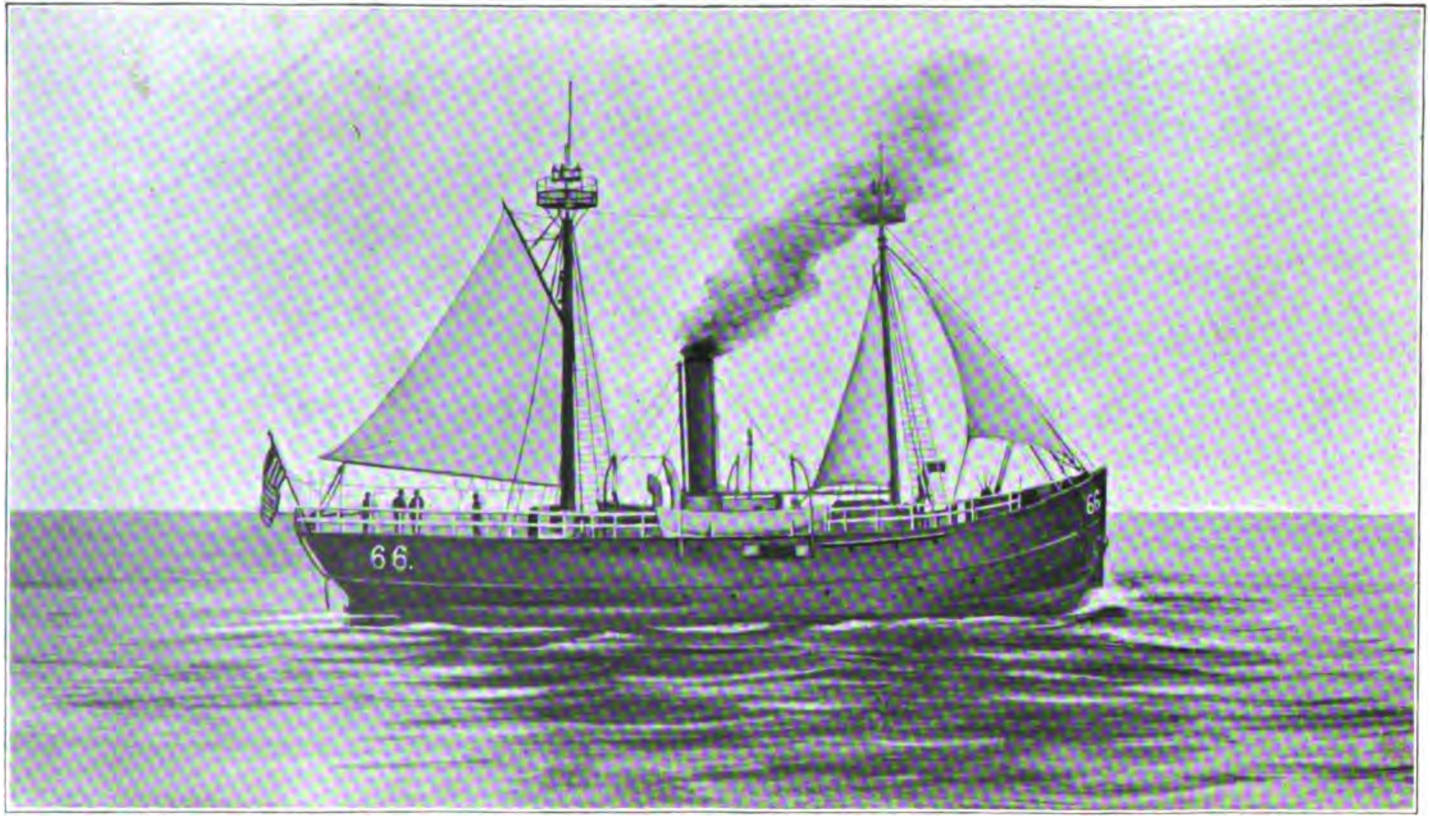
TO THE

SECRETARY OF THE TREASURY

FOR THE

FISCAL YEAR ENDED JUNE 30, 1896.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1896.



Nantucket Shoals Light-Vessel.

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Feb. 11 SEP 7 1898

From the

TREASURY DEPARTMENT,
Document No. 1911.
Office of Light-House Board.

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LIGHT-HOUSE BOARD OF THE UNITED STATES.

Organized in conformity to the act of Congress approved August 31, 1852.

LIST OF MEMBERS ON JUNE 30, 1896.

Hon. JOHN G. CARLISLE, Secretary of the Treasury, ex officio president.
Rear-Admiral JOHN G. WALKER, United States Navy, chairman.
Col. WALTER S. FRANKLIN.
Col. JOHN M. WILSON, Corps of Engineers, United States Army.
Capt. JOHN R. BARTLETT, United States Navy.
Lieut. Col. ALEXANDER MACKENZIE, Corps of Engineers, United States Army.
Gen. WILLIAM W. DUFFIELD, Superintendent of the United States Coast and Geodetic Survey.
Commander GEORGE F. F. WILDE, United States Navy, naval secretary.
Capt. JOHN MILLIS, Corps of Engineers, United States Army, engineer secretary.

EXECUTIVE MEMBERS OF THE BOARD.

Rear-Admiral JOHN G. WALKER, United States Navy.
Commander GEORGE F. F. WILDE, United States Navy.
Capt. JOHN MILLIS, Corps of Engineers, United States Army.

OFFICERS IN CHARGE OF LIGHT-HOUSE DISTRICTS ON JUNE 30, 1896.

FIRST DISTRICT.

Inspector.—Commander N. MAYO DYER, United States Navy, Portland, Me.

Engineer.—Maj. WILLIAM R. LIVERMORE, Corps of Engineers, United States Army, Boston, Mass.

SECOND DISTRICT.

Inspector.—Commander FRANCIS M. GREEN, United States Navy, Boston Mass.

Engineer.—Maj. WILLIAM R. LIVERMORE, Corps of Engineers, United States Army, Boston, Mass.

THIRD DISTRICT.

Inspector.—Commander ALBERT S. SNOW, United States Navy, Tompkinsville, N. Y.

Engineer.—Lieut. Col. WILLIAM LUDLOW, Corps of Engineers, United States Army, Tompkinsville, N. Y.

FOURTH DISTRICT.

Inspector.—Commander CHARLES J. TRAIN, United States Navy, Philadelphia, Pa.

Engineer.—Maj. WILLIAM H. BIXBY, Corps of Engineers, United States Army, Philadelphia, Pa.

FIFTH DISTRICT.

Inspector.—Commander BENJAMIN P. LAMBERTON, United States Navy, Baltimore, Md.

Engineer.—Maj. ERNEST H. RUFFNER, Corps of Engineers, United States Army, Baltimore, Md.

SIXTH DISTRICT.

Inspector.—Commander SETH M. ACKLEY, United States Navy, Charleston, S. C.

Engineer.—Capt. FREDERIC V. ABBOT, Corps of Engineers, United States Army, Charleston, S. C.

SEVENTH DISTRICT.

Inspector.—Commander WILLIAM B. NEWMAN, United States Navy, Pensacola Navy-Yard, Fla.

Engineer.—Maj. JAMES B. QUINN, Corps of Engineers, United States Army, New Orleans, La.

EIGHTH DISTRICT.

Inspector.—Commander JOSEPH B. COGHLAN, United States Navy, New Orleans, La.

Engineer.—Maj. JAMES B. QUINN, Corps of Engineers, United States Army, New Orleans, La.

NINTH DISTRICT.

Inspector.—Commander JAMES H. DAYTON, United States Navy, Chicago, Ill.

Engineer.—Maj. MILTON B. ADAMS, Corps of Engineers, United States Army, Detroit, Mich.

TENTH DISTRICT.

Inspector.—Commander CHARLES V. GRIDLEY, United States Navy, Buffalo, N. Y.

Engineer.—Lieut. Col. JARED A. SMITH, Corps of Engineers, United States Army, Cleveland, Ohio.

ELEVENTH DISTRICT.

Inspector.—Commander WILLIAM M. FOLGER, United States Navy, Detroit, Mich.

Engineer.—Maj. MILTON B. ADAMS, Corps of Engineers, United States Army, Detroit, Mich.

TWELFTH DISTRICT.

Inspector.—Commander FRANK COURTIS, United States Navy, San Francisco, Cal.

Engineer.—Maj. CHARLES E. L. B. DAVIS, Corps of Engineers, United States Army, San Francisco, Cal.

THIRTEENTH DISTRICT.

Inspector.—Lieut. Commander JOHN P. MERRELL, United States Navy, Portland, Oreg.

Engineer.—Capt. W. L. FISK, Corps of Engineers, United States Army, Portland, Oreg.

FOURTEENTH DISTRICT.

Inspector.—Lieut. Commander WILLIAM W. GILLPATRICK, United States Navy, Cincinnati, Ohio.

Engineer.—Maj. WILLIAM H. HEUER, Corps of Engineers, United States Army, Cincinnati, Ohio.

FIFTEENTH DISTRICT.

Inspector.—Lieut. Commander ABRAHAM B. H. LILLIE, United States Navy, St. Louis, Mo.

Engineer.—Lieut. Col. AMOS STICKNEY, Corps of Engineers, United States Army, St. Louis, Mo.

SIXTEENTH DISTRICT.

Inspector.—Commander WILLIAM T. BURWELL, United States Navy, Memphis, Tenn.

Engineer.—Lieut. Col. AMOS STICKNEY, Corps of Engineers, United States Army, St. Louis, Mo.

PERSONNEL.

The following changes have taken place in the personnel of the Light-House Board since the date of the last annual report:

1. On August 24, 1895, Maj. **Henry M. Adams**, Corps of Engineers, United States Army, was succeeded by Lieut. Col. **Alexander Mackenzie**, Corps of Engineers, United States Army.

2. On November 5, 1895, Capt. **George Dewey**, United States Navy, was succeeded by Capt. **John R. Bartlett**, United States Navy.

The following-named changes in the personnel of the district officers took place during the fiscal year:

First District.

Inspector.—Commander **George E. Wingate**, United States Navy, to June 30, 1896; Commander **N. Mayo Dyer**, United States Navy, from June 30, 1896.

Third District.

Engineer.—Lieut. **William E. Craighill**, Corps of Engineers, United States Army, to October 23, 1895; Maj. **Henry M. Adams**, Corps of Engineers, United States Army, from October 23, 1895, to May 20, 1896; Lieut. Col. **William Ludlow**, Corps of Engineers, United States Army, from May 20, 1896.

Fourth District.

Inspector.—Commander **George C. Reiter**, United States Navy, to June 30, 1896; Commander **Charles J. Train**, United States Navy, from June 30, 1896.

Engineer.—Maj. **Charles W. Raymond**, Corps of Engineers, United States Army, to September 30, 1895; Maj. **William H. Bixby**, Corps of Engineers, United States Army, from September 30, 1895.

Fifth District.

Engineer.—Capt. **Eric Bergland**, Corps of Engineers, United States Army, to November 6, 1895; Maj. **Ernest H. Ruffner**, Corps of Engineers, United States Army, from November 6, 1895.

Sixth District.

Inspector.—Commander **M. R. S. Mackenzie**, United States Navy, to May 25, 1896; Commander **Seth M. Ackley**, United States Navy, from May 25, 1896.

Engineer.—Capt. **Eric Bergland**, Corps of Engineers, United States Army, to November 6, 1895; Maj. **Ernest H. Ruffner**, Corps of Engineers, United States Army, to December 31, 1895; Capt. **Frederic V. Abbot**, Corps of Engineers, United States Army, from December 31, 1895.

Eleventh District.

Inspector.—Commander **William W. Mead**, United States Navy, to April 30, 1896; Commander **William M. Folger**, United States Navy, from April 30, 1896.

Twelfth District.

Inspector.—Commander **Henry E. Nichols**, United States Navy, to September 30, 1895; Commander **Frank Courtis**, United States Navy, from September 30, 1895.

Engineer.—Maj. **William H. Heuer**, Corps of Engineers, United States Army, to January 31, 1896; Maj. **Charles E. L. B. Davis**, Corps of Engineers, United States Army, from January 31, 1896.

THIRTEENTH DISTRICT.

Inspector.—Commander OSCAR W. FARENHOLT, United States Navy, to June 30, 1896; Lieut. Commander JOHN P. MERRELL, United States Navy, from June 30, 1896.

Engineer.—Maj. JAMES C. POST, Corps of Engineers, United States Army, to December 17, 1895; Capt. WALTER L. FISK, Corps of Engineers, United States Army, from December 17, 1895.

FOURTEENTH DISTRICT.

Engineer.—Lieut. Col. AMOS STICKNEY, Corps of Engineers, United States Army, to February 6, 1896; Maj. WILLIAM H. HEUER, Corps of Engineers, United States Army, from February 6, 1896.

FIFTEENTH DISTRICT.

Engineer.—Lieut. Col. CHARLES R. SUTER, Corps of Engineers, United States Army, to January 14, 1896; Lieut. Col. AMOS STICKNEY, Corps of Engineers, United States Army, from January 14, 1896.

SIXTEENTH DISTRICT.

Inspector.—Commander ANDREW J. IVERSON, United States Navy, to June 30, 1896; Commander WILLIAM T. BURWELL, United States Navy, from June 30, 1896.

Engineer.—Lieut. Col. CHARLES R. SUTER, Corps of Engineers, United States Army, to January 14, 1896; Lieut. Col. AMOS STICKNEY, Corps of Engineers, United States Army, from January 14, 1896.

REPORT

OF

THE UNITED STATES LIGHT-HOUSE BOARD.

TREASURY DEPARTMENT,
OFFICE OF THE LIGHT-HOUSE BOARD,
Washington, D. C., November 12, 1896.

SIR: The Light-House Board has the honor to submit the following report for the fiscal year which ended on June 30, 1896:

At the close of the year there were under the control of the Light-House Establishment the following-named aids to navigation:

Light-houses and beacon lights, including twenty-seven temporary lights, Mobile Harbor	1,091
Light-vessels in position	41
Light-vessels for relief	5
Electric-lighted buoys in position	16
Lighted buoys in position, including two buoys, temporary system, Mobile Harbor	18
Fog signals operated by steam, caloric, or oil engines	137
Fog signals operated by clockwork	193
Post lights	1,765
Day or unlighted beacons	422
Whistling buoys in position	70
Bell buoys in position	106
Other buoys in position, including pile buoys and stakes in Fifth district and buoys in Alaskan waters	4,665

In the construction, care, and maintenance of these aids to navigation there were employed—

Steam tenders	32
Steam launches	5
Sailing tenders	2
Light keepers	1,253
Other employees, including crews of light-ships and tenders	1,108
Laborers in charge of post lights	1,360

NEW LIGHTS.

The following-named lights were established during the fiscal year:

Coquille Point, Yaquina Bay, Oregon.—A tubular-lantern light, July 1, 1895.

Point Isabel, Gulf of Mexico, Texas.—A third-order light, July 15, 1895.

Delaware Breakwater (west end), Delaware Bay, Delaware.—A lens-lantern light, July 20, 1895.

Mosquito Creek, Georgetown Harbor, South Carolina.—A lantern light, August 8, 1895.

Marsh Islands, Georgetown Harbor, South Carolina.—A lantern light, August 8, 1895.

Frazier Point, Georgetown Harbor, South Carolina.—A lantern light, August 8, 1895.

Hare Island, Georgetown Harbor, South Carolina.—A lantern light, August 8, 1895.

Waccamaw Shoal, Georgetown Harbor, South Carolina.—A lantern light, August 8, 1895.

Mother Bunch Island, Georgetown Harbor, South Carolina.—A lantern light, August 8, 1895.

Gloucester Point Wharf Post Light, York River, Virginia.—A lens-lantern light, August 26, 1895.

Purtan Bay post light, York River, Virginia.—A lens-lantern light, August 26, 1895.

Purtan Island post light, York River, Virginia.—A lens-lantern light, August 26, 1895.

Potopotank Creek post light, York River, Virginia.—A lens-lantern light, August 26, 1895.

Jones Island Range, entrance to Savannah River, South Carolina.—Two reflector lights, August 27, 1895.

Oyster Beds Range (front), entrance to Savannah River, Georgia.—A lens-lantern light, August 27, 1895.

Yaquina North Jetty, Yaquina Bay, Oregon.—A tubular lantern light, August 31, 1895.

Murderkill Creek Range, Delaware Bay, Delaware.—Two lens-lantern lights, September 9, 1895.

St. Jones Creek Range, Delaware Bay, Delaware.—Two lens-lantern lights, September 9, 1895.

Plantation Creek Range, Brunswick Harbor, Georgia.—Two reflector lights, September 10, 1895.

Jekyl Island Range, Brunswick Harbor, Georgia.—Two reflector lights, September 10, 1895.

Colonels Island Range, Brunswick Harbor, Georgia.—Two reflector lights, September 10, 1895.

Ecorse Range, Detroit River, Michigan.—Two sixth-order lights, September 15, 1895.

Solomons Lump, Chesapeake Bay, Maryland.—A fifth-order light (reestablished), September 30, 1895.

Middle Neebish Cut (north side), St. Marys River, Michigan.—Three lantern lights, October 5, 1895.

Middle Neebish Cut (south side), St. Marys River, Michigan.—Three lantern lights, October 5, 1895.

Middle Neebish Cut Range, St. Marys River, Michigan.—Two lens-lantern lights, October 5, 1895.

Junction, Hay Lake, St. Marys River, Michigan.—A lantern light, October 5, 1895.

Lower Hay Lake Range, St. Marys River, Michigan.—Two lens-lantern lights, October 5, 1895.

Lower Hay Lake Cut (west side), St. Marys River, Michigan.—Two lantern lights, October 5, 1895.

Lower Hay Lake Cut (east side), St. Marys River, Michigan.—Two lantern lights, October 5, 1895.

Nine-Mile Point, Hay Lake, St. Marys River, Michigan.—A lens-lantern light, October 5, 1895.

Middle Hay Lake Range, St. Marys River, Michigan.—Two lens-lantern lights, October 5, 1895.

Frechette Point Range, Hay Lake, St. Marys River, Michigan.—Two lens-lantern lights, October 5, 1895.

Six-Mile Point Range, Hay Lake, St. Marys River, Michigan.—Two lens-lantern lights, October 5, 1895.

Little Rapids Cut (west side), Hay Lake, St. Marys River, Michigan.—Two lantern lights, October 5, 1895.

Little Rapids Cut (east side), Hay Lake, St. Marys River, Michigan.—Two lantern lights, October 5, 1895.

North Entrance, Hay Lake, St. Marys River, Michigan.—A fifth-order light, October 5, 1895.

Kewaunee Pierhead Range (front), Lake Michigan, Wisconsin.—A lantern light, October 17, 1895.

Crooked River Range, St. George Sound, Florida.—A fourth-order and a lens-lantern light, October 28, 1895.

Neeah Bay post light, Strait of Juan de Fuca, Washington.—A tubular lantern light, October 31, 1895.

Jones Rocks, Lond Island Sound, Connecticut.—A lantern light, November 9, 1895.

Manitowoc Breakwater, Lake Michigan, Wisconsin.—A lens-lantern light, November 11, 1895.

Port Chester, Long Island Sound, Connecticut.—A lantern light, November 18, 1895.

Mendota, Lake Superior, Michigan.—A fourth-order light, November 30, 1895.

Proctor Place, Savannah River, South Carolina.—A lantern light, December 10, 1895.

Oglethorpe Range (*rear*), *Savannah River*, *Georgia.*—A lantern light, December 10, 1895.

Grand Marais Harbor of Refuge, *Lake Superior*, *Michigan.*—A sixth-order light, December 10, 1895.

Two Harbors Breakwater, *Lake Superior*, *Minnesota.*—A lantern light, December 14, 1895.

Willamette River, *junction of Columbia and Willamette rivers*, *Oregon.*—A lens-lantern light, December 31, 1895.

English Turn Bend post light, *Mississippi River*, *Louisiana.*—A tubular lantern light, January 21, 1896.

South Boston Range, *Boston Harbor*, *Massachusetts.*—Two electric arc lights, February 29, 1896.

Coquille River, *mouth of Coquille River*, *Oregon.*—A fourth-order light, February 29, 1896.

Reedy Island Range (*rear*), *Delaware River*, *Delaware.*—A lens-lantern light, March 14, 1896.

Mobile Ship Channel, *Mobile Bay*, *Alabama.*—Six lantern lights, March 21, 1896.

Sandusky Bay Straight Channel Range, *Lake Erie*, *Ohio.*—Two sixth-order lights, April 1, 1896.

Grassy Island South Channel Range (*front*), *Detroit River*, *Michigan.*—A lens-lantern light, April 3, 1896.

Pigeon Point post light, *Grand Lake*, *Louisiana.*—A lantern light, May 6, 1896.

Twenty-Foot Channel, *Lake St. Clair*, *Michigan.*—One lantern and two lens-lantern lights, May 10, 1896.

Ames Ledge, *Kennebec River*, *Maine.*—A lantern light, May 11, 1896.

Sturgeon Bay Canal, *between Lake Michigan and Sturgeon Bay*, *Wisconsin.*—Three lantern lights, May 14, 1896.

Round Island, *Straits of Mackinac*, *Michigan.*—A fourth-order light, May 15, 1896.

Snead Point Shoal, *Manatee River*, *Florida.*—A lens-lantern light, May 20, 1896.

Manatee River Cut, *Manatee River*, *Florida.*—A lens-lantern light, May 20, 1896.

Jerrys Point, *Little Harbor*, *Portsmouth*, *New Hampshire.*—A lens-lantern light, May 25, 1896.

Frost Point, *Little Harbor*, *Portsmouth*, *New Hampshire.*—A lens-lantern light, May 25, 1896.

Wilkinson Point Shoal, *Neuse River*, *North Carolina.*—A lantern light, May 25, 1896.

Otter Creek, *Neuse River*, *North Carolina.*—A lantern light, May 25, 1896.

Great Salt Pond Breakwater, *Block Island*, *Rhode Island.*—A lantern light, May 30, 1896.

Brazos River, *mouth of Brazos River*, *Texas.*—A third-order light, May 30, 1896.

Lower Mile Point Cut post light, St. Johns River, Florida.—A lantern light, June 1, 1896.

Middle Mile Point Cut post light, St. Johns River, Florida.—A lantern light, June 1, 1896.

Middle Cedar Creek Cut post light, St. Johns River, Florida.—A lantern light, June 1, 1896.

Upper Cedar Creek Cut post light, St. Johns River, Florida.—A lantern light, June 1, 1896.

New Berlin Cut Range post lights, St. Johns River, Florida.—Two lantern lights, June 1, 1896.

Quarantine Island post light, St. Johns River, Florida.—A lantern light, June 1, 1896.

Racine Pierhead, Lake Michigan, Wisconsin.—A sixth-order light (reestablished), June 18, 1896.

The Jump post light, Mississippi River, Louisiana.—A lantern light, June 25, 1896.

Socola post light, Mississippi River, Louisiana.—A lantern light, June 25, 1896.

Enterprise Beacon, Wadmelaw River, South Carolina.—A lantern light, June 30, 1896.

Hart Beacon, Wadmelaw River, South Carolina.—A lantern light, June 30, 1896.

Shaffer Beacon, Wadmelaw River, South Carolina.—A lantern light, June 30, 1896.

NEW FOG SIGNALS.

During the fiscal year fog signals were established at the following-named existing light stations:

Rockland Lake, Hudson River, New York.—A bell struck by machinery, August 22, 1895.

Seul Choix Pointe, Lake Michigan, Michigan.—A 10-inch steam whistle, September 6, 1895.

Solomons Lump, Chesapeake Bay, Maryland.—A bell struck by machinery, September 30, 1895.

Eagle Harbor, Lake Superior, Michigan.—A 10-inch steam whistle, November 30, 1895.

South Fox Island, Lake Michigan, Michigan.—A 10-inch steam whistle, December 10, 1895.

Burnt Island, Boothbay Harbor, Maine.—A bell struck by machinery, January 30, 1896.

Portsmouth Harbor (Newcastle), New Hampshire.—A bell struck by machinery, February 29, 1896.

Castle Hill, Narragansett Bay, Rhode Island.—A bell struck by machinery, March 18, 1896.

Sheboygan Pierhead, Lake Michigan, Wisconsin.—A 10-inch steam whistle, March 20, 1896.

Marrowstone Point, Admiralty Inlet, Washington.—A bell struck by machinery, April 7, 1896.

Little Traverse, Lake Michigan, Michigan.—A bell struck by machinery, May 27, 1896.

Racine Pierhead, Lake Michigan, Wisconsin.—A bell struck by machinery, June 18, 1896.

In addition to the foregoing the following new fog signals were established during the fiscal year:

Manitowoc Breakwater, Lake Michigan, Wisconsin.—A 10-inch steam whistle, November 30, 1895.

Grand Marais Harbor of Refuge, Lake Superior, Michigan.—A bell struck by machinery, December 10, 1895.

Willamette River, junction of Columbia and Willamette rivers, Oregon.—A bell struck by machinery, December 31, 1895.

Coquille River, mouth of Coquille River, Oregon.—A Daboll trumpet, February 29, 1896.

LIGHTS DISCONTINUED.

In the course of the fiscal year the following-named lights were discontinued:

Yaquina Bar Range (front), Yaquina Bay, Oregon.—A lens-lantern light, July 29, 1895.

Dark Hole West Range, St. Marys River, Michigan.—Two tubular lantern lights, September 11, 1895.

Sheboygan Pierhead (front), Lake Michigan, Wisconsin.—A lantern light, September 30, 1895.

Mobile Ship Channel, Mobile Bay, Alabama.—Fifteen lantern lights, March 21, 1896.

Sandusky Bay West and North ranges, Lake Erie, Ohio.—One reflector and two lens-lantern lights, April 1, 1896.

Marblehead Mast light, Marblehead Neck, Massachusetts.—A tubular lantern light, April 17, 1896.

Fishers Point Range, Delaware River, New Jersey.—Two tubular lantern lights, April 30, 1896.

Grossepointe Beacon, Lake St. Clair, Michigan.—Two lantern lights, May 10, 1896.

San Carlos Creek post light, St. Johns River, Florida.—A tubular lantern light, June 1, 1896.

Dame Point Dredged Cut post light, No. 12, St. Johns River, Florida.—A tubular lantern light, June 1, 1896.

Racine Pierhead, Lake Michigan, Wisconsin.—A lantern light, June 18, 1896.

Sand Point post light, No. 2, Indian River, Florida.—A tubular lantern light, June 30, 1896.

Addison Point post light, No. 4, Indian River, Florida.—A tubular lantern light, June 30, 1896.

Magnolia Point post light, No. 8, Indian River, Florida.—A tubular lantern light, June 30, 1896.

Cleveland post light, No. 1, Indian River, Florida.—A tubular lantern light, June 30, 1896.

Cape Cod post light, No. 3, Indian River, Florida.—A tubular lantern light, June 30, 1896.

Fisherman Point post light, No. 7, Indian River, Florida.—A tubular lantern light, June 30, 1896.

Cape Malabar post light, No. 14, Indian River, Florida.—A tubular lantern light, June 30, 1896.

Grant Farm post light, No. 9, Indian River, Florida.—A tubular lantern light, June 30, 1896.

Grant Farm (lower) post light, No. 14½, Indian River, Florida.—A tubular lantern light, June 30, 1896.

Grant Farm (upper) post light, No. 9½, Indian River, Florida.—A tubular lantern light, June 30, 1896.

Micco post light, No. 16, Indian River, Florida.—A tubular lantern light, June 30, 1896.

Orchid post light, No. 11, Indian River, Florida. A tubular lantern light, June 30, 1896.

Houston post light, No. 18, Indian River, Florida.—A tubular lantern light, June 30, 1896.

Bethel post light, No. 13, Indian River, Florida.—A tubular lantern light, June 30, 1896.

Indian River Narrows (lower) post light, No. 15, Indian River, Florida—A tubular lantern light, June 30, 1896.

Crawford Point post light, No. 15½, Indian River, Florida.—A tubular lantern light, June 30, 1896.

Barrel Stake post light, No. 20¼, Indian River, Florida.—A lantern light, June 30, 1896.

Burnetts Canal post light, No. 20½, Indian River, Florida.—A lantern light, June 30, 1896.

Bradley Reserve post light, No. 17, Indian River, Florida.—A tubular lantern light, June 30, 1896.

Garfield post light, No. 22, Indian River, Florida.—A tubular lantern light, June 30, 1896.

Taylor Creek post light, No. 22½, Indian River, Florida.—A tubular lantern light, June 30, 1896.

Ankony post light, No. 19, Indian River, Florida.—A tubular lantern light, June 30, 1896.

St. Lucie post light, No. 21, Indian River, Florida.—A tubular lantern light, June 30, 1896.

North Narrows post light, No. 24, Indian River, Florida.—A tubular lantern light, June 30, 1896.

Tahiti post light, No. 34, Indian River, Florida.—A tubular lantern light, June 30, 1896.

Long Canal post light, No. 38, Indian River, Florida.—A tubular lantern light, June 30, 1896.

Long Canal post light, No. 40, Indian River, Florida.—A lantern light, June 30, 1896.

Ash-Pan Shoals post light, No. 23, Indian River, Florida.—A tubular lantern light, June 30, 1896.

FOG SIGNAL DISCONTINUED.

The following-named fog signal was discontinued during the fiscal year:

Manitowoc Pierhead, Lake Michigan, Wisconsin.—A bell struck by machinery, November 30, 1895.

CHANGES IN LIGHTS.

During the fiscal year the following changes were made in existing lights:

Whitefish Point, Lake Superior, Michigan.—Color of tower changed from brown to white, July 5, 1895.

Barlow Point Range (rear) post light, Columbia River, Oregon.—Height increased to 31 feet, July 16, 1895.

Cape Charles, entrance to Chesapeake Bay, Virginia.—Changed from flashing white every 45 seconds to a group of four and a group of five white flashes every 30 seconds, August 15, 1895.

Dunkirk Pierhead, Lake Erie, New York.—Changed from fixed white to fixed red, August 15, 1895.

Seul Choix Pointe, Lake Michigan, Michigan.—Changed from fourth to third order light, August 15, 1895.

Venus Point, Savannah River, Georgia.—Changed from a reflector to a lens-lantern light, and height reduced to 35 feet, August 24, 1895.

Middle Ground, Yaquina Bay, Oregon.—Height increased to 32¼ feet, August 31, 1895.

Goose Rocks, Fox Islands Thorofare, Maine.—Color of tower changed from brown to red, September 1, 1895.

Conneaut Pierhead, Lake Erie, Ohio.—Height increased to 35 feet, September 8, 1895.

Sampit River, Winyah Bay, South Carolina.—Changed from one tubular lantern to two tubular lanterns, one red and one white, October 17, 1895.

Point Lookout, entrance to Potomac River, Maryland.—Red sector in light discontinued, November 30, 1895.

Bush Bluff light-vessel, Elizabeth River, Virginia.—Tender *Holly* replaced by schooner *Drift*, December 9, 1895.

Barnwell Place post light, Savannah River, South Carolina.—Changed from fixed red to fixed white, December 10, 1895.

Erie Range No. 1, Presqu'ile Bay, Pennsylvania.—Tower rebuilt and height increased to 21 feet, December, 1895.

Corner Stake, Newark Bay, New Jersey.—New structure erected November 18, 1895, and an oil house January 18, 1896.

Hog Island, seacoast of Virginia.—Changed from fixed white of the fourth order to flashing white of the first order, and height increased to 180 feet, January 31, 1896.

Egmont Key, entrance to Tampa Bay, Florida.—Two narrow red sectors, one to cover Southwest Channel bell buoy, and the other to cover North Channel Entrance whistling buoy substituted for the single red sector, March 6, 1896.

Coanjock Bay beacon, Albemarle and Chesapeake Canal, North Carolina.—Changed from an oil to a gas light, March 11, 1896.

Whitefish Point, Lake Superior, Michigan.—Changed to show a brilliant white flash every 5 seconds, April 13, 1896.

Marblehead, Marblehead Neck, Massachusetts.—Height increased to 130 feet, April 17, 1896.

Middle Neebish Cut Range (front), St. Marys River, Michigan.—Height decreased to 17 feet, May 2, 1896.

Cubits Gap post light, Mississippi River, Louisiana.—Changed from a tubular to a lens lantern light, May 18, 1896.

Cape Charles, entrance to Chesapeake Bay, Virginia.—Interval between the flashes doubled so as to show a group of four and a group of five white flashes every minute, June 1, 1896.

Timbalier, Timbalier Island, Louisiana.—Changed from a tubular lantern to a lens lantern light, June 1, 1896.

Pilot Island range lights, St. Marys River, Michigan.—Changed from fixed red to fixed white, June 4, 1896.

Egmont Key, entrance to Tampa Bay, Florida.—Changed from fourth to third order, June 6, 1896.

CHANGES IN FOG SIGNALS.

During the fiscal year the following changes were made in fog signals:

Cleveland West Breakwater (east end), Lake Erie, Ohio.—Changed to sound blasts of 3 seconds' duration, separated by silent intervals of 57 seconds, and a sounding board erected to deflect the sound toward the lake, July 1, 1895.

Winter Quarter Shoal light-vessel, No. 45, seacoast of Virginia.—Changed from a steam whistle to a Crosby automatic whistle operated by compressed air, giving blasts of 3 seconds' duration, separated by alternate silent intervals of 59 and 60 seconds, October 18, 1895.

Grays Reef light-vessel, No. 57, Lake Michigan, Michigan.—Changed to sound two blasts of 1 second each, followed by a silent interval of 20 seconds, and one blast of 3 seconds, followed by a silent interval of 15 seconds, April 20, 1896.

Portage Lake Ship Canal Pierhead, Lake Michigan, Wisconsin.—Changed from a bell struck by machinery to a 10-inch steam whistle, April 21, 1896.

Simmons Reef light-vessel, No. 55, Lake Michigan, Michigan.—Changed to sound blasts of 5 seconds' duration, separated by silent intervals of 55 seconds, April 21, 1896.

Seguin, entrance to Kennebec River, Maine.—Changed to sound blasts of 3 seconds' duration, separated by silent intervals of 57 seconds, April 30, 1896.

Cape Elizabeth, Casco Bay, Maine.—Changed to sound blasts of 3 seconds' duration, separated by alternate silent intervals of 9 and 45 seconds, April 30, 1896.

Portland Head, entrance to Portland Harbor, Maine.—Changed to sound blasts of 2 seconds' duration, separated by silent intervals of 13 seconds, April 30, 1896.

Whaleback, entrance to Portsmouth Harbor, New Hampshire.—Changed to sound blasts of 3 seconds' duration, separated by silent intervals of 17 seconds, April 30, 1896.

Great Round Shoal light-vessel, No. 42, seacoast of Massachusetts.—Changed from a steam whistle to a whistle operated by compressed air, June 1, 1896.

CHANGES IN LOCATION.

During the fiscal year the following-described changes in location were made:

Gedney Channel whistling buoy, entrance to New York Bay, New York.—Moved about 2,800 feet ESE. ¼ E., July 1, 1895.

Big Sodus (inner), Lake Ontario, New York.—Moved about 25 feet northerly to a new tower, July 6, 1895.

South Shoal whistling buoy, Delaware Bay, New Jersey.—Moved about one-fourth mile SW. by W. ½ W., July 17, 1895.

Seul Choix Pointe, Lake Michigan, Michigan.—Moved 98 feet N. ¾ W. to a new tower, August 15, 1895.

Cape Charles, entrance to Chesapeake Bay, Virginia.—Moved about three fourths mile WNW. ⅜ W. to a new tower, August 15, 1895.

Conneaut Pierhead, Lake Erie, Ohio.—Moved to a new tower on the outer end of pier, September 8, 1895.

Dark Hole East Range (front), St. Marys River, Michigan.—Moved about 200 feet to the westward, September 11, 1895.

Dark Hole, East Range (rear), St. Marys River, Michigan.—Moved nearly 200 feet to the westward, September 11, 1895.

Point of Woods Range (front), St. Marys River, Michigan.—Moved about 114 feet to the northward, September 11, 1895.

Point of Woods Range (rear), St. Marys River, Michigan.—Moved about 114 feet to the northward, September 11, 1895.

Pilot Island Range (front), St. Marys River, Michigan.—Moved about 500 feet to the eastward, September 21, 1895.

Pilot Island Range (rear), St. Marys River, Michigan.—Moved about 500 feet to the eastward, September 21, 1895.

Sheboygan Pierhead, Lake Michigan, Wisconsin.—Moved about 230 feet nearer the outer end of pier, September 30, 1895.

Cape Ann whistling buoy, off Cap Ann, Massachusetts.—Moved to a position about 2½ miles ESE. from Cape Ann light-house, October 30, 1895.

Rockland Breakwater, Penobscot Bay, Maine.—Moved about 298 feet to the southward, November 20, 1895.

Chandeleur, Mississippi Sound, Louisiana.—Moved about 1,850 feet east-southeasterly, December 20, 1895.

Torresdale post light, Delaware River, Pennsylvania.—Moved about 125 feet northeasterly, December 27, 1895.

Hog Island, seacoast of Virginia.—Moved about one-half mile N. ⅜ W. to a new tower, January 31, 1896.

Lower gas buoy, Mobile Bay, Alabama.—Moved to the southward and eastward into 23 feet of water, 2½ miles S. ⅛ E. from Lower Channel beacon No. 51, March 21, 1896.

Upper gas buoy, Mobile Bay, Alabama.—Moved about one-half mile to the southward, March 21, 1896.

Plum Beach Shoal gas buoy, Narragansett Bay, Rhode Island.—Moved nearly three-eighths mile south-southwesterly, March 21, 1896.

Muskegon Lake beacon, Lake Michigan, Michigan.—Moved about 100 feet to westward, March, 1896.

Genesee, Lake Ontario, New York.—Moved 300 feet northeasterly to near the outer end of pier, April 10, 1896.

Marblehead, Marblehead Neck, Massachusetts.—Moved from temporary tower to new iron tower erected on the site of old tower, April 17, 1896.

Western Breakwater bell buoy, New Haven Harbor, Connecticut.—Moved into 26 feet of water off the new breakwater, April 25, 1896.

Newburyport Bar whistling buoy, entrance to Merrimac River, Massachusetts.—Moved to the southward to conform to change in channel, May 1, 1896.

Grossepointe light-vessel, No. 10, Lake St. Clair, Michigan.—Moved 1$\frac{3}{16}$ miles NNE. $\frac{7}{16}$ E. to the upper end of the 20-foot channel, May 10, 1896.

Cubits Gap post light, Mississippi River, Louisiana.—Moved 125 feet to the southward, May 18, 1896.

NEW BUOYS.

During the fiscal year the following-named special buoys were established:

Goose Island Flat, Delaware River, Delaware.—A gas-lighted buoy, July 1, 1895.

Inner Buoy, Presqu'ile Bay, Pennsylvania.—A gas-lighted buoy, July 5, 1895.

Jones Inlet, south side of Long Island, New York.—A bell buoy, July 9, 1895.

Seventeen-Foot Knoll, Delaware River, New Jersey.—A gas-lighted buoy, July 15, 1895.

Gowanus Flats, (southwest end), New York Upper Bay, New York.—A bell buoy, July 24, 1895.

Lynn Harbor, Massachusetts Bay, Massachusetts.—A bell buoy, July 29, 1895.

Winthrop Bar, Broad Sound, Massachusetts.—A bell buoy, July 29, 1895.

Jerry Ledge, Narraguagus Bay, Maine.—A bell buoy, August 13, 1895.

Entrance to Savannah River, Georgia.—A bell buoy, August 15, 1895.

Clous Ledge, Sheepscot River, Maine.—A bell buoy, August 23, 1895.

Seguin Island, entrance to Kennebec River, Maine.—A whistling buoy, August 23, 1895.

Sewall Point, Elizabeth River, Virginia.—An experimental bell buoy, September 7, 1895. Discontinued November, 1895.

Sabine Pass, seacoast of Louisiana.—A whistling buoy, October 17, 1895.

East Jetty, Sabine Pass, Louisiana.—A bell buoy, October 17, 1895.

White Island, Isles of Shoals, New Hampshire.—A whistling buoy, February 10, 1896.

Plum Beach Shoal, Narragansett Bay, Rhode Island.—A gas-lighted buoy, February 19, 1896.

Entrance to St. Helena Sound, South Carolina.—A whistling buoy, March 2, 1896.

Entrance to Port Royal Sound, South Carolina.—A bell buoy, March 2, 1896.

Old Cilly Ledge, Georges Islands, Maine.—A bell buoy, April 23, 1896.

Ohio Ledge, Narragansett Bay, Rhode Island.—A bell buoy, April 30, 1896.

Despair Island, Narragansett Bay, Rhode Island.—A bell buoy, May 25, 1896.

North Hill Reef, Fishers Island Sound, Rhode Island.—A bell buoy, May 29, 1896.

Straight Channel, Maumee Bay, Lake Erie, Ohio.—A gas-lighted buoy, June 1, 1896.

Outer Shoal, Porte des Morts Passage, Lake Michigan—A bell buoy, June 3, 1896.

Mile Rock, entrance to San Francisco Bay, California.—A bell buoy, June 4, 1896.

Craney Island Flats (north end), Elizabeth River, Virginia.—A bell buoy, June 5, 1896.

Great Salt Pond Breakwater, Block Island, Rhode Island.—A bell buoy, June 10, 1896.

Sail Rock, entrance to Quoddy Roads, Maine.—A whistling buoy, June 17, 1896.

Inner end of Straight Channel, Maumee Bay, Lake Erie, Ohio.—An oil-lighted buoy, June 19, 1896.

BUOYS DISCONTINUED.

In the course of the fiscal year the following-named special buoys were discontinued:

Trinity Shoal, seacoast of Louisiana.—A bell buoy, July 17, 1895.

Jones Rocks, Long Island Sound, Connecticut.—A gas-lighted buoy, November 12, 1895.

Clous Ledge, Sheepscot River, Maine.—A bell buoy, March 13, 1896.

Bayside Range Channel, New York Lower Bay, New York.—An electric-lighted buoy, June 15, 1896.

TEMPORARY CHANGES IN AIDS TO NAVIGATION.

The following temporary changes were made in aids to navigation during the fiscal year:

Superior Bay Channel (lower) post light, Superior Bay, Minnesota.—Demolished by collision June 29, 1895; reestablished July 5, 1895. Again carried away July 29 and August 21, 1895, and rebuilt soon after.

Great Round Shoal light-vessel, easterly entrance to Nantucket Sound, Massachusetts.—Fog signal disabled July 1, 1895; light-vessel No. 42 removed for repairs and light-vessel No. 39 placed on station October 1, 1895; light-vessel No. 9 substituted for light-vessel No. 39 January 15, 1896; light-vessel No. 42 returned to station June 1, 1896.

Sandy Hook light-vessel, entrance to New York Bay, New York.—Light-vessel No. 51 returned to station and light-vessel No. 16 withdrawn, July 3, 1895.

Wreck of the Addie G. Bryant, Pollock Rip, Massachusetts.—A lantern light established on wreck July 25, 1895; wreck removed and light discontinued October 1, 1895.

Northeast End light-vessel, seacoast of New Jersey.—Light-vessel No. 44 removed for repairs and station marked by a whistling buoy July 29, 1895; light-vessel replaced and whistling buoy removed August 15, 1895.

Fenwick Island Shoal light-vessel, seacoast of Maryland.—Light-vessel No. 52 removed for repairs and station marked by a whistling and a bell buoy August 7, 1895; light-vessel replaced and buoys removed August 25, 1895.

Poe Reef light-vessel, Lake Huron, Michigan.—Light-vessel No. 62 fouled by a raft and dragged 1,500 feet to westward August 6, 1895; replaced in position August 11, 1895.

Martins Industry light-vessel, off Port Royal, South Carolina.—Light-vessel No. 1 replaced and light-vessel No. 29 withdrawn August 20, 1895.

Southeast Bend (upper), St. Clair River, Michigan.—Structure demolished and temporary light shown, August 21, 1895.

Indian Point Range (rear), St. Marys River, Michigan.—Demolished by lightning September 3, 1895; temporary light shown until structure was rebuilt September 28, 1895.

Gedney and Bayside Range Cut channels, New York Lower Bay, New York.—New system of electric buoys damaged and lights extinguished September 5, 1895; old system used until repairs were made and new system relighted September 10, 1895.

Superior Bay Channel (upper) post light, Superior Bay, Minnesota.—Demolished by passing raft and light extinguished September 6, 1895; reestablished September 8, 1895.

Gedney and Bayside Range Cut channels, New York Lower Bay, New York.—New system of electric buoys extinguished and old system used from September 24 to October 1, 1895, and from October 10 to October 16, 1895.

Beacon light, No. 9, North River, North Carolina.—Beacon demolished June 21, 1895, and an oil light shown until beacon was rebuilt, September 27, 1895.

Gedney Channel, entrance to New York Lower Bay, New York.—An experimental whistling buoy established October 2, 1895; discontinued February 15, 1896.

Frying Pan Shoals, off Cape Fear, North Carolina.—Light-vessel No. 53 removed for repairs and light-vessel No. 29 placed on station October 6, 1895; light-vessel No. 53 replaced November 13, 1895.

Wreck of the Itaska, St. Clair River, Michigan.—A lantern light established on wreck, October 8, 1895. Discontinued November 30, 1895.

Wreck of the Kate Kelly, Lake Michigan, Wisconsin.—The tubular lantern light established on this wreck June 15, 1895, was discontinued October 11, 1895.

Cape Charles light-vessel, No. 49, entrance to Chesapeake Bay, Virginia.—The steam whistle, which had been disabled, was repaired October 15, 1895.

Wreck of the Bruce, St. Marys River, Michigan.—A lantern light was established on wreck, October 18, 1895.

Winter Quarter Shoal light-vessel, seacoast of Virginia.—Light-vessel No. 45, which was removed for repairs January 17, 1895, was replaced and light-vessel No. 9 withdrawn October 18, 1895.

Wreck of the Frank H. Magee, near Pollock Rip, Massachusetts.—A lantern light established on wreck, October 28, 1895. Discontinued November 2, 1895.

Cape Flattery, entrance to Strait of Juan de Fuca, Washington.—Owing to scarcity of water, characteristics of fog signal changed to a blast every 5 minutes October 29, 1895; usual characteristics restored November 11, 1895.

Wreck of the Lillie, Boston Harbor, Massachusetts.—A gas-lighted buoy established October 30, 1895; discontinued January 7, 1896.

Ashtabula Range (rear), Lake Erie, Ohio.—Structure demolished and light extinguished November 1, 1895; reestablished November 4, 1895.

Ohio Central Coal Dock post light, Superior Bay, Minnesota.—Structure demolished November 4, 1895; temporary light shown until close of navigation 1895; light reestablished at opening of navigation 1896.

Little Captain Island East Reef gas buoy, Long Island Sound, Connecticut.—Taken up for the winter November 12, 1895; replaced May 26, 1896.

Pollock Rip light-vessel, No. 47, seacoast of Massachusetts.—Dragged from position November 13, 1895; replaced November 15, 1895.

Inner Light buoy, Presqu'ile Bay, Pennsylvania.—Taken up for the winter November 18, 1895; replaced April 18, 1896.

Hay Lake Channel, St. Marys River, Michigan.—Floating lights removed for the winter December 3, 1895; replaced at the opening of navigation 1896.

Bar Point light-vessel, No. 59, mouth of Detroit River, Michigan.—Removed for the winter December 5, 1895; replaced April 6, 1896.

Ballard Reef light-vessel, No. 63, Detroit River, Michigan.—Removed for the winter December 5, 1895; replaced April 7, 1896.

Limekiln Crossing (south) light-vessel, No. 64, Detroit River, Michigan.—Removed for the winter December 6, 1895; replaced April 7, 1896.

Limekiln Crossing (north) light-vessel, No. 65, Detroit River, Michigan.—Removed for the winter December 6, 1895; replaced April 7, 1896.

Eleven-Foot Shoal light-vessel, No. 60, Green Bay, Michigan.—Removed for the winter December 8, 1895; replaced April 20, 1896.

Grossepointe light-vessel, No. 10, Lake St. Clair, Michigan.—Removed for the winter December 9, 1895; replaced April 9, 1896.

Lake Huron light-vessel, No. 61, southerly end of Lake Huron, Michigan.—Removed for the winter December 10, 1895; replaced April 16, 1896.

Poe Reef light-vessel, No. 62, Lake Huron, Michigan.—Removed for the winter December 12, 1895; replaced April 20, 1896.

Simmons Reef light-vessel, No. 55, Lake Michigan, Michigan.—Removed for the winter December 12, 1895; replaced April 21, 1896.

White Shoal light-vessel, No. 56, Lake Michigan, Michigan.—Removed for the winter December 12, 1895; replaced April 20, 1896.

Grays Reef light-vessel, No. 57, Lake Michigan, Michigan.—Removed for the winter December 12, 1895; replaced April 20, 1896.

Green Flats post light, Hudson River, New York.—Demolished by ice and light extinguished December 12, 1895; reestablished May 6, 1896.

Dunkirk Pierhead, Lake Erie, New York.—Demolished in storm of December 12, 1895; reestablished April 17, 1896.

Mobile Ship Channel, Mobile Bay, Alabama.—Beacon No. 41, which was demolished, and the beacon opposite Mobile Bay light-house, which was removed to facilitate dredging, were reestablished December 13, 1895.

Frying Pan Shoals light-vessel, No. 53, off Cape Fear, North Carolina.—Went adrift in storm of December 19, 1895; replaced December 22, 1895.

Cross Rip light-vessel, No. 5, Nantucket Sound, Massachusetts.—Removed for repairs and station marked by light-vessel No. 9 December 20, 1895; replaced January 15, 1896.

Moosabec Reach, seacoast of Maine.—Discontinued for the winter December 30, 1895; relighted March 13, 1896.

Joshua Rocks post light, Connecticut River, Connecticut.—Damaged by ice and light extinguished January 15, 1896; reestablished April 17, 1896.

Meadows post light, Connecticut River, Connecticut.—Damaged by ice and light extinguished January 15, 1896; reestablished at opening of navigation 1896.

Deep River post light, Connecticut River, Connecticut.—Damaged by ice and light extinguished January 15, 1896; reestablished April 30, 1896.

Mouse Island (lower) post light, Connecticut River, Connecticut.—Damaged by ice and light extinguished January 15, 1896; reestablished at the reopening of navigation 1896.

Mouse Island (upper) post light, Connecticut River, Connecticut.—Damaged by ice and light extinguished January 15, 1896; reestablished at the reopening of navigation 1896.

Dog River Bar beacon, No. 1, Mobile Bay, Alabama.—Demolished by collision January 15, 1896; reestablished January 18, 1896.

Pollock Rip light-vessel, No. 47, seacoast of Massachusetts.—Removed for repairs and station marked by light-vessel No. 39 January 16, 1896; replaced February 18, 1896.

Portland Breakwater, Portland Harbor, Maine.—Fog bell on Staniford Ledge buoy removed to this light-house for the winter January 20, 1896; replaced on buoy May 16, 1896.

Wreck of the William Wilson, Nantucket Sound, Massachusetts.—A gas-lighted buoy established January 21, 1896; discontinued March 28, 1896.

Ice House post light, Thames River, Connecticut.—Damaged by ice and light extinguished January 25, 1896; reestablished April 7, 1896.

Long Reach (lower) post light, Thames River, Connecticut.—Damaged by ice and light extinguished January 25, 1896; reestablished March 27, 1896.

Mohegan Dike post light, Thames River, Connecticut.—Damaged by ice and light extinguished January 25, 1896; reestablished March 28, 1896.

Sand Pier post light, Thames River, Connecticut.—Damaged by ice and light extinguished January 25, 1896; reestablished April 4, 1896.

Burnt House Pier post light, Thames River, Connecticut.—Damaged by ice and light extinguished January 27, 1896; reestablished April 7, 1896.

Gedney and Bayside Range Cut channels, New York Lower Bay, New York.—New system of electric buoys damaged and lights extinguished February 6, 1896; old system lighted February 10, 1896; new system repaired and relighted March 10, 1896. New system again extinguished March 11 and relighted March 23, and again extinguished March 27 and relighted April 6, 1896. Old system was used while new was extinguished.

Fishers Point Range (front) post light, Delaware River, New Jersey.—Carried away in storm of February 6, 1896; reestablished February 14, 1896.

Browns Head, Fox Islands Thorofare, Maine.—Discontinued on account of ice February 22, 1896; relighted March 1, 1896.

Wreck of the Ailsa, New York Upper Bay, New York.—A lantern light established on wreck, March 1, 1896.

West Flats post light, Hudson River, New York.—Carried away by ice March 1, 1896; reestablished May 9, 1896.

Colt Pier Range post lights, Connecticut River, Connecticut.—Carried away by a freshet March 4, 1896; reestablished on subsidence of the river.

Corner Stake, Newark Bay, New Jersey.—Extinguished by ice March 4, relighted March 6, 1896.

Press Barn Bar Range post lights, Connecticut River, Connecticut.—Carried away by a freshet March 11, 1896; reestablished on the subsidence of the river.

East Brother Island, San Francisco Bay, California.—Fog signal disabled April 3, repaired April 6, 1896.

Wreck of the Blairmore, San Francisco Bay, California.—Temporary light-vessel established April 9, discontinued April 14, 1896.

Cape San Blas, Gulf of Mexico, Florida.—Third-order light discontinued during removal of tower and a temporary lantern light established April 13, 1896.

Alcatraz, San Francisco Bay, California.—Fog signal disabled April 13, repaired April 15, 1896.

Hog Island, seacoast of Virginia.—Lens damaged, so that the flashes were not regular, April 15, repaired May 13, 1896.

Cape Neddick, York Nubble, Maine.—Fog bell disabled April 16, repaired April 20, 1896.

East Haddam Meadows post light, Connecticut River, Connecticut.—Damaged by a freshet and light extinguished April 19, reestablished April 22, 1896.

Church Point, St. Marys River, Michigan.—Carried away by ice April 19; temporary light established April 25; reestablished July 22, 1896.

Portage River Range (north), Portage River, Michigan.—Carried away by ice and temporary light established April 25, 1896.

Sandy Hook light-vessel, No. 51, entrance to New York Bay, New York.—Removed for repairs and light-vessel No. 16 placed on station May 10, replaced July 10, 1896.

Negro Island, Penobscot Bay, Maine.—Moved 40 feet ENE. ½ E. to a temporary tower, May 11, 1896.

Straitsmouth, north side of Cape Ann, Massachusetts.—Moved 45 feet S. ¾ E. to a temporary tower, May 11, 1896.

Limekiln Crossing (south) light-vessel, No. 64, Detroit River, Michigan.—Damaged by collision and withdrawn for repairs May 11; temporary light shown; replaced May 22, 1896.

Cornfield Point light-vessel, No. 48, Long Island Sound, Connecticut.—Removed for repairs and station marked by light-vessel No. 20 May 20, replaced July 2, 1896.

South Pass light-vessel, No. 43, entrance to Mississippi River, Louisiana.—Removed for the summer months May 20, 1896.

Wreck of the Andrew Jackson, New York Lower Bay, New York.—Light established on wreck May 22, discontinued May 29, 1896.

Middle Beacon, Twenty-Foot channel, Lake St. Clair, Michigan.—Damaged June 1; repaired June 3; demolished by collision June 15; reestablished July 1, 1896.

Smith Point light-vessel, No. 46, Chesapeake Bay, Virginia.—Removed for repairs and station marked by a gas-lighted buoy June 19, replaced July 16, 1896.

Aids to navigation maintained by the Light-House Board, June 30, 1896.

Aids.	First district.	Second district.	Third district.	Fourth district.	Fifth district.	Sixth district.	Seventh district.	Eighth district.	Ninth district.	Tenth district.	Eleventh district.	Twelfth district.	Thirteenth district.	Fourteenth district.	Fifteenth district.	Sixteenth district.	Atlantic Coast.	Pacific Coast.	Lake Coast.	Western rivers.	Total entire coast, 1895.	Total entire coast, 1896.	Increase or decrease.
Electric lights	....	3	1	....	....	....	....	....	....	....	....	....	....	....	....	....	4	....	....	....	2	4	2
First-order lights	2	4	6	5	7	7	8	2	....	....	....	9	9	....	....	....	41	18	....	....	58	59	1
Second-order lights	7	3	1	....	....	1	....	3	1	....	2	1	....	....	....	....	15	1	3	....	19	19	....
Third-order lights	6	1	5	8	....	4	5	5	8	6	8	3	1	....	....	....	29	4	22	....	53	55	2
Three-and-a-half-order lights	....	2	....	....	....	....	1	....	3	....	4	....	....	....	....	....	3	....	7	....	10	10	....
Fourth-order lights	19	23	38	13	40	7	6	13	32	23	34	10	8	....	....	....	156	18	92	....	264	266	2
Fifth-order lights	24	16	20	7	23	4	1	14	14	6	15	5	2	....	....	....	106	7	88	....	149	151	2
Sixth-order lights	1	5	31	3	11	6	1	2	20	19	13	....	....	....	....	....	51	....	61	....	106	112	6
Lens lanterns	4	1	6	9	23	10	13	3	5	14	41	4	12	....	....	....	68	16	61	....	126	145	19
Range lenses	....	....	6	8	2	....	....	....	....	....	....	....	....	....	....	....	16	....	....	....	16	16	....
Reflectors	....	9	....	8	4	21	....	2	....	3	....	....	....	....	....	....	44	....	3	....	42	47	5
Tubular and other lanterns	4	6	130	7	11	141	13	54	17	3	79	7	86	529	525	360	343	93	122	1,414	1,950	1,972	22
Light-vessels in position	....	10	7	4	3	3	....	2	4	4	3	....	1	....	....	....	29	1	11	....	41	41	....
Electric-lighted buoys	....	....	10	....	....	....	....	....	....	....	....	....	....	....	....	....	10	....	....	....	11	10	—1
Gas-lighted buoys	....	5	3	4	1	....	....	2	....	3	....	....	....	....	....	....	15	....	3	....	12	18	6
Total lighted aids	67	88	264	71	125	204	48	102	104	81	199	39	119	529	525	360	930	158	423	1,414	2,859	2,925	66
Fog signals operated by steam, hot air, or oil engines	13	10	16	6	4	2	....	1	27	6	26	15	11	....	....	....	52	26	59	....	130	137	7
Fog signals operated by clockwork	19	10	52	7	64	3	....	11	8	3	4	7	5	....	....	....	165	12	16	....	185	193	8
Day beacons	103	73	38	5	11	48	35	14	....	....	2	46	42	5	....	....	327	88	2	5	424	422	—2
Whistlings buoys	14	11	5	4	1	7	3	5	....	....	....	12	8	....	....	....	50	20	....	....	66	70	4
Bell buoys	20	17	26	5	2	16	5	2	....	....	2	7	4	....	....	....	93	11	2	....	96	106	10
Other buoys	656	500	583	187	1,127	296	265	110	98	136	351	72	284	....	....	....	3,724	356	585	....	4,547	4,665	118
Total unlighted aids	825	621	720	214	1,209	372	308	143	133	145	385	159	354	5	....	....	4,411	513	664	5	5,448	5,593	145
Total number of aids	892	709	984	285	1,334	576	356	245	237	226	584	198	473	534	525	360	5,341	671	1,087	1,419	8,307	8,518	211

Appropriations made at the first session of the Fifty-fourth Congress for the Light-House Establishment.

GENERAL PURPOSES.

Supplies of light-houses	$385,000
Repairs of light-houses	550,000
Salaries of light-keepers	695,000
Expenses of light-vessels	300,000
Expenses of buoyage	430,000
To establish certain gas buoys	4,000
Expenses of fog signals	90,000
Lighting of rivers	300,000
Survey of light-house sites	1,000

SPECIAL WORKS.

Big Sable, Mich., fog signal	5,500
Carlton Island, New York, light station	6,000
Coos Bay, Oregon, post and range lights	500
Devils Island, Wisconsin, light station, an unexpended balance of	4,000
Diamond Shoal, North Carolina, light-vessel, an unexpended balance of	80,000
Fire Island, New York, light-vessel, with power to contract up to $80,000	40,000
Fort Stevens, Oreg., light and fog signal	11,000
Fort Wadsworth, N. Y., light and fog signal	1,500
Galloo Island, New York, fog signal	5,700
Galveston, Tex., jetty light station	35,000
Lynn Harbor, Massachusetts, lighted beacons	2,000
Mahon River, Delaware, light station	8,500
Maurice River, New Jersey, range lights	4,500
Menominee, Mich., light and fog-signal station	5,000
North Manitou Island, Lake Michigan, Board authorized to lease land necessary for its site until a perfect title can be secured.	
Plum Beach, Rhode Island, light and fog-signal station, for finishing	40,000
Portage, Mich., lake and river lights	10,500
St. Joseph, Mich., pierhead fog signal	5,000
Sandusky Bay, Ohio, range-lights stations	30,000
San Francisco, Cal., harbor light-vessel, with power to contract to $80,000.	40,000
Smiths Point, Maryland, light-house, for finishing	41,000
Spring Point Ledge, Maine, light and fog-signal station, for finishing	25,000
Staten Island, New York, light-house depot, for continuing	25,000
Tender for the Second light-house district, with power to contract to $75,000.	37,500
Tender for the Seventh and Eighth light-house districts, with power to contract to $75,000	37,500
Umatilla Reef, Washington, light-vessel, for finishing	37,000
Yerba Buena, Cal., light-house and buoy depot	30,000
Oil houses	5,000

NEW WORKS AUTHORIZED.

Congress authorized, by act approved on February 15, 1893, the establishment of a number of light-stations at an aggregated cost of nearly half a million dollars, but made no appropriation at that time for their construction. Since then from time to time appropriation has been made for the erection of many of them. The following is a list of the light-stations remaining for which no appropriation has yet been made, with the maximum amount which each may cost:

Bay State Shoal lights, New York	$800
Erie Harbor (Presqu'ile) fog signal, Pennsylvania	4,300
Fairport Harbor fog signal, Ohio	4,300
Lorain Harbor (Black River) fog signal, Ohio	4,300
Poe Reef light-vessel, Straits of Mackinac, Michigan	25,000
Sand Hills light-house, Michigan	20,000
Bayfield light and fog signal, Wisconsin	5,000
Pats (or Hat) Point light and fog signal, Minnesota	15,000
Ludington light and fog-signal station, Michigan, keeper's dwelling	4,500
St. Martin Island light, Michigan	15,000
Little Gull Island light and fog signal, Michigan	20,000
Peshtigo Shoal, Green Bay, Wisconsin	10,000
Wilson Harbor light, New York	2,500
Big Oyster Bed Shoal light and fog signal, New Jersey	25,000
Deer Point light, Florida	1,000
New York Slough light and fog signal, California	10,000
Mermenteau River light, Louisiana	7,000
Willamette River, Oregon, 25 beacon lights and buoys between Salem and Portland	5,000

A detailed statement of the work done in each of the sixteen light-house districts is made in the body of the report, under specified headings, from which it will be evident that the Board has brought the numerous and varied aids to navigation under its charge up to the proper standard, and that it has done all that was possible, with the funds provided, to meet the requirements of commerce and navigation.

SUPPLIES OF LIGHT-HOUSES.

The appropriation for 1893, 1894, 1895, and 1896 was $385,000 for each year. While the appropriation was the same last year that it was on each of the four previous years, the number of light-stations has been increased from 951 in 1893 to 1,095 in 1896, and it is reasonable to expect that appropriations will be made during the coming session of Congress for still other lights. To meet this increased demand for necessary supplies, the Board has found it impossible, with the funds provided, to keep its reserve stock of supplies to meet emergencies. This stock has been so heavily drawn upon that to-day there are no surplus stores on hand. The meagerness of preceding appropriations has made it necessary for the Board to cut down the quantity of supplies furnished yearly to the light-houses to such an extent that it can go no further without danger to the lights. In spite of the severe economy used, there is danger that the present lights and those which are being built can not be properly kept up without an increase of appropriation. The Board therefore estimates that $410,000 will be needed for providing supplies for light-houses during the coming fiscal year.

REPAIRS AND INCIDENTAL EXPENSES OF LIGHT-STATIONS.

The estimate submitted under this head is $600,000. The appropriation for the current year is $550,000. From this appropriation must be paid the cost of repairs and maintenance of all shore stations, numbering now some 1,500, many of which are very old and therefore costly to maintain, as well as the cost of constructing beacon lights to mark the ends of pierheads, and at other localities on inland waterways and harbors. The law requires the Light-House Board to erect such beacon lights, but special appropriations for this purpose are not made, and estimates can not be submitted in advance, since the erection of these beacons usually depends upon the completion of piers and breakwaters or the completion or progress of other works of improvement made by the Government to inland waterways, which must be marked by suitable lights to render them available to commerce at night as soon as they are opened to vessels. The cost of spare illuminating apparatus which must be kept on hand to replace that which may be damaged or destroyed in service, is also paid from the appropriation for repairs and incidental expenses. Needed renewals of buildings at light-stations can be done from the appropriation for general repairs if this is made sufficient, and special estimates for this purpose are therefore not submitted. The amount asked is urgently needed for the efficient and economical maintenance of the service.

SALARIES OF LIGHT-HOUSE KEEPERS.

Last year Congress appropriated $695,000 to pay the salaries of not exceeding 1,250 light-house and fog-signal keepers; but on June 30, 1896, 1,253 keepers were employed. At the present writing, November 10, 1896, there are 1,275 keepers on duty. This appropriation was insufficient, and the Board had to resort to one of two plans—either lights must be extinguished or the Board must ask for an urgency deficiency appropriation of $10,000 to meet the deficiencies. The latter course has been adopted. The rapidly increasing demands of commerce have required largely increased numbers of steam fog signals, and hence additional keepers become necessary. The appropriations do not permit the Board to pay the average rates allowed by law, and hence it finds itself embarrassed to secure and retain reliable men to fill and retain these positions. This sum is scarcely an estimate; it is rather a fixed amount, the result of close calculation, and it is earnestly recommended that $710,000, the amount asked, be appropriated.

EXPENSES OF LIGHT-VESSELS.

Congress appropriated $300,000 to defray the expenses of light-vessels during this fiscal year. The appropriation has been expended, and many needed repairs go over to next year. The cost of maintaining the light-vessel which was established off Fire Island, New

York, on July 15, 1896, is to be defrayed not only from the appropriation for this year, but from that for the coming year. The wear and tear on the older light-vessels was greater than usual, owing to their increased age. Within the past three years the number of lightships established has been increased by 33 per cent, but there has been no corresponding increase in appropriations necessary to meet the increased cost of maintenance. Before the beginning of the next fiscal year it is expected that the four new light-vessels for which appropriation was made by acts approved on March 2, 1895, and on June 11, 1896, will be ready for duty. It will cost on the average $5,000 per year to maintain these vessels. The Board estimates therefore, that the expenses of light-vessels for the ensuing fiscal year will be at least $350,000, and it is recommended that an appropriation of that amount be made therefor.

EXPENSES OF BUOYAGE.

Congress at its last session appropriated $430,000 for the expenses of buoyage during the current fiscal year. There are now some 4,831 buoys of all kinds in position. The buoys which were carried away or sunk at their moorings during the past year were replaced from the stock held in reserve, and that reserve stock has not been replaced for lack of funds. The Board, therefore, will need a larger appropriation than usual, not only to meet the immediate wants of commerce, but to bring up its stock of reserve buoys to its normal condition. The Board was unable to place buoys at certain places for which request was made, not because it was unnecessary to do so, but because the appropriation therefor was insufficient. Funds are needed to maintain buoys after they are established. It is estimated that it will require $500,000 to defray the expenses of buoyage during the coming year, and it is recommended that an appropriation of this amount be made therefor.

The Board, under the orders of the Secretary of the Treasury, as required by the act approved May 16, 1896, has already expended $3,248.05 in placing anchorage buoys in the harbor of New York, and it is constantly incurring further expenses in replacing those. The appropriation made for expenses of buoyage during the current fiscal year was barely sufficient to pay the usual expenses. Hence the Board is forced to ask that appropriation of $10,000 be made for these further expenses of buoyage in the urgent deficiency bill.

EXPENSES OF FOG SIGNALS.

The appropriation for this important part of the service was $90,000 for the past year. Notwithstanding that the number of fog signals has been constantly increasing under special appropriations made by Congress for new light and fog-signal stations, and by the establishment of fog signals at existing light-stations under the authority of law and to meet the growing demands of commerce, the annual appropriation for the maintenance of these signals has been quite inadequate for a number of years past. While there will be for many years to come a demand for additional lights as well as fog signals in waters where the full commercial development is yet to be realized, the improvement now most needed in the way of aids to navigation where the system of lights is approaching completion is more effective fog signals. In these localities by far the larger portion of the accidents to vessels take place during thick weather, when the lights are not effective and when audible signals alone are available. The conditions are now such that it is impossible to maintain the service in a proper condition and to replace obsolete apparatus and make other urgently needed improvements at existing stations without increased appropriations for this purpose.

In the earlier development of sound signals for maritime purposes the United States led the world, and the majority of appliances now in general use for this purpose originated in this country and were first used by the Light-House Board. Important improvements have since been made, however, and many of them by officers in the Light-House Service of this country, which the Board has been unable to apply for lack of funds. Some of the improvements which are urgently needed and which could now be made are more efficient quick-steaming boilers for stations using steam signals, to facilitate starting the signal when needed and to afford greater economy in operation; compressed-air apparatus operated by oil engines for stations where the water supply is deficient, and improved striking apparatus to render fog bells more effective.

It is therefore again recommended that the appropriation for fog signals be made $125,000, which is regarded as a very conservative estimate.

LIGHTING OF RIVERS.

The appropriation of $300,000 made at the last session of Congress was barely sufficient to maintain the post lights which had already been established; and it was insufficient to enable the Board to establish and maintain other lights which it is evident are much needed. It is estimated that $350,000 will be required to defray the expenses of lighting rivers during the next fiscal year, and it is recommended that an appropriation of this amount be made therefor.

NEW LIGHT-STATIONS AND DEPOTS.

The estimates for special appropriations for new light-stations and depots have been revised with particular care to bring them up to date and to make them conform to the actual needs of navigation in the various districts throughout the coast and inland waters. Several estimates formerly submitted for special appropriations to rebuild or renew existing structures have been omitted, as such work can be done more advantageously under the general appropriation for repairs, provided the latter be made sufficient, and the special estimates are thereby reduced to a minimum.

NEW LIGHT-VESSELS.

The Board has recommended in the proper places in the body of this report that appropriations be made for building six new light-vessels. Each is much needed, but attention is especially invited to the urgent necessity for a relief light-vessel in the Fourth light-house district.

Appropriation was made at the last session of Congress for half of the amount sufficient to build two light-vessels, to be stationed respectively off Fire Island, New York, and San Francisco, Cal., and to contract up to double the amount appropriated for that purpose. Attention is called to the need that the other half of the amount required be appropriated at the coming session of Congress.

NEW TENDERS.

Recommendation is made in certain of the following pages that appropriations be made for finishing the construction which has been begun of steamers to be used as light-house tenders in the Second and Seventh light-house districts, to replace old steamers.

Recommendation is also made in the proper place in this report that appropriation be made for the construction of a light-house tender for use in the Third light-house district to take place of a vessel now there, which is so nearly worn out that it can only last if used with care until a new vessel can be built to take its place.

LIGHT-HOUSE EXHIBIT AT THE COTTON STATES AND INTERNATIONAL EXPOSITION HELD AT ATLANTA, GA., IN 1895.

In compliance with instructions of the Treasury Department of May 16, 1895, the Board prepared and sent to Atlanta an exhibit of the Light-House Establishment, as follows:

One third-order lens, flashing.
One fourth-order lens, flashing.
One light-vessel lantern.
One first-order mineral-oil lamp.
One 1-day lantern.
One 8-day lantern.
One light-house keeper's lamp.
One fog-bell striking apparatus.
One model of Fowey Rocks light-house.
One model of gas buoy.
One model of river lights.
One lens lantern, 8-day.
One model of whistling buoy.
One model of Minots Ledge light-house.
One model of Spectacle Reef light-house.
Two models of light-vessels

The foregoing exhibit was prepared and shipped from the general depot at Staten Island, and upon its arrival at Atlanta it was unpacked and set up under the supervision of Mr. Jacob Jose, assistant civil engineer, who was detailed for the purpose by the Board.

The exhibit was fully installed on September 20, 1895, the opening day of the exposition.

During the continuation of the exposition the light-house exhibit was under the charge of regular light-house keepers, who were detailed for the purpose upon recommendation of the district inspectors as a mark of appreciation of faithful service. These details were as follows:

George T. Clifford, keeper Pensacola (Fla.) light-station, from September 17 to October 14, 1895.

Harry C. Claiborne, keeper Bolivar Point (Texas) light-station, from October 14 to November 9, 1895.

Tillman F. Smith, keeper Cape Hatteras (North Carolina) light-station, from November 9 to December 5, 1895.

James A. Armour, keeper Jupiter Inlet (Florida) light-station, from December 5 to December 31, 1895.

Upon the close of the exhibition the light-house property was repacked under the direction of Mr. Jose and returned to the general light-house depot.

OIL HOUSES.

The Board again recommends that appropriation be made for the erection of small, inexpensive structures near to, but separate from, light-houses, in which to keep a year's supply of mineral oil, the illuminant now used by the Light-House Establishment. An appropriation of $5,000 was made for that purpose for the current year.

It is estimated that $10,000 will be needed and can be profitably expended in building oil houses during the coming fiscal year, and the appropriation of that amount is therefore recommended.

THE FLAG AT LIGHT-STATIONS.

The Board in session on October 1, 1894, decided that it would take measures, as soon as practicable, to display the United States flag from each light-house. A committee was directed to formulate a plan and estimates for carrying the decision into effect. The committee recommended that two flags, one 10 feet and the other 6 feet long, with proper serving halyards, be furnished to each light-station.

It is estimated that $10,000 can be profitably used for this purpose during the coming year, and it is recommended that an appropriation of this amount be made therefor.

ESTIMATES OF GENERAL APPROPRIATIONS.

Supplies of light-houses	$410,000.00
Repairs of light-houses	600,000.00
Salaries of keepers of light-houses	710,000.00
Expenses of light-vessels	350,000.00
Expenses of buoyage	500,000.00
Expenses of fog signals	125,000.00
Lighting of rivers	350,000.00
Survey of light-house sites	1,000.00
Oil houses for light-stations	10,000.00
Flags and flagstaffs at light-stations	10,000.00

ESTIMATES FOR SPECIAL APPROPRIATIONS.

Libby Islands light-station, Maine, keeper's dwelling	$6,000.00
on Island light-station, Maine, keeper's dwelling	3,400.00
ape Elizabeth light-station, Maine, keeper's dwelling	2,000.00
Little River Head, Maine, fog signal	10,500.00
es of Shoals, New Hampshire, fog signal	5,500.00
hitlocks Mill light-station, Maine	250.00
atinicus Rock light-station, Maine, keeper's dwelling	3,200.00
urnt Coat Harbor light-station, Maine, roadway	500.00
te Ledge light and fog-signal station, Massachusetts	42,000.00
katy Head light-station, Massachusetts, roadway	300.00
nder for the Second light-house district	37,500.00
ster Pond (or Orient) Point light and fog-signal station, New York, reestablishing beacon	5,000.00
ck Ledge light and fog-signal station, Connecticut	45,000.00
w Haven Harbor Breakwater light and fog-signal station, Connecticut	45,000.00
g Island Shoal light and fog-signal station, Rhode Island	35,000.00
rt Island fog-signal station, New York	2,500.00
reys Hook light and fog-signal station, New York	3,000.00
a Island fog-signal station, New York	1,200.00
pus Island fog-signal station, New York	1,200.00
thwest Spit light and fog-signal station, New York	50,000.00
st Bank light and fog-signal station, New York	50,000.00
ens Ledge light and fog-signal station, Connecticut	60,000.00
ks Ledge light and fog-signal station, Connecticut	10,000.00
g Beach Beacon light-station, Connecticut	2,500.00
walk Harbor lighted beacons, Connecticut	600.00
e Island light-vessel, New York	40,000.00
der for the Third light-house district	85,000.00
en Island light-house depot, New York, sea wall, etc	25,000.00
e May light-station, New Jersey, keeper's dwelling	4,000.00
rfalls Shoal light-vessel, New Jersey	80,000.00
ief light-vessel for the Fourth and Fifth light-house districts	80,000.00
gemoor light-house and buoy depot, Delaware, repairing	10,000.00
imbursement of losses of seamen in the Light-House Service	127.25
ckade Shoal light-station, North Carolina	5,000.00
llers Point range lights and Hog Island light, James River, Virginia	2,500.00
gged Point light and fog-signal station, Virginia	20,000.00
ppahannock River, Virginia, additional lights	3,300.00
e Lookout Shoals light-vessel, North Carolina	80,000.00
aretto Point light-house depot, Maryland, keeper's dwelling	2,500.00
tsmouth light-house depot, Virginia, repairing wharf, etc	15,000.00
pe Fear light-station, North Carolina	70,000.00
pe Fear River range lights, North Carolina	3,105.00
ide Passage beacon lights, Georgia and Florida	4,000.00
pot for the Sixth light-house district	35,000.00
imbursement of losses of light-keepers in the Sixth light-house district	2,399.13
pe San Blas light-station, Florida, removal	4,500.00
mont Key light-station, Florida, keeper's dwelling	3,500.00
alachicola Bay Range light-station, Florida	7,000.00
Joseph Point light-station, Florida	15,000.00
octawhatchee Bar, Florida, range lights	2,000.00
y West light-house and buoy depot, Florida, repairing wharf, etc	10,000.00
nder for the Seventh and Eighth light-house districts	37,500.00

Sand Island light-station, Alabama, rebuilding	$65,000.
Red Fish Bar light-station, Texas, reestablishing	8,000.
Reimbursement for losses of light-keepers in the eighth light-house district	2,603.
Grand Traverse (Cat Head) light and fog-signal station, Michigan	5,500.
Menasha range lights, Wisconsin	500.
South Milwaukee light-station, Wisconsin	7,500.
Tail Point light and fog-signal station, Wisconsin, moving	7,500.
Fishermans Shoal light and fog-signal station, Wisconsin	50,000.
Ludington light and fog-signal station, Michigan, keeper's dwelling	4,500.
Kewaunee light station, Wisconsin, keeper's dwelling	7,500.
Portage Lake light-station, Michigan, keeper's dwelling	3,500.
Depot for the Ninth and Eleventh light-house districts, Michigan	15,000.
Grassy Island Range light-station (Ecorst), Michigan	5,000.
Grosse Isle (North Channel) Range light-station, Michigan, keeper's dwelling	3,500.
Grosse Isle (South Channel) Range light-station, Michigan, keeper's dwelling	5,000.
Chapman Shoal light and fog-signal station, New York	25,000.
Old Point, New York, range lights and keeper's dwelling	10,000.
Ballards Reef, Detroit River, light-vessel and two float lights	1,500.
Depot for the Tenth light-house district	(*)
Chequamegon Point light and fog-signal station, Wisconsin, completing	1,500.
Lake St. Clair light and fog-signal stations, Michigan	20,000.
Middle Island light and fog-signal station, Michigan	25,000.
Mud Lake light station, Michigan	3,500.
Head of St. Marys River, Michigan, range lights	1,000.
Portage River light-station, Lake Superior, Michigan, fog signal	5,500.
Crisps Point light and fog-signal station, Michigan	18,000.
Rock of Ages light and fog-signal station, Michigan	50,000.
Poe Reef light-vessel, Straits of Mackinac, Michigan	15,000.
St. Martins Reef light-vessel, Lake Huron	15,000.
Grand Marais Harbor of Refuge, Lake Superior, Michigan	(*)
Quarry Point fog-signal station, California	6,000.
Point Arguello light and fog-signal station, California	35,000.
San Francisco Harbor light-vessel, California	40,000.
Point Sur light-station, California, keeper's dwelling	6,000.
Cape Mendocino light-station, California, keeper's dwelling	5,500.
Yerba Buena light-house and buoy depot, California, pumping plant for increasing water supply	5,100.
Point Hueneme light-station, California, roadway, right of way	3,000.
Point Pinos light-station, California, land	2,000.
Pigeon Point light-station, California, enlarging site	5,000.
Point No Point light-station, Washington, fog signal	6,000.
Point Brown Beacon light and fog-signal station, Washington	6,000.
Battery Point light and fog-signal station, Washington	6,000.
Tongue Point light-house depot, Oregon	5,000.
New Dungeness light-station, Washington, keeper's dwelling	4,000.

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* Authority.

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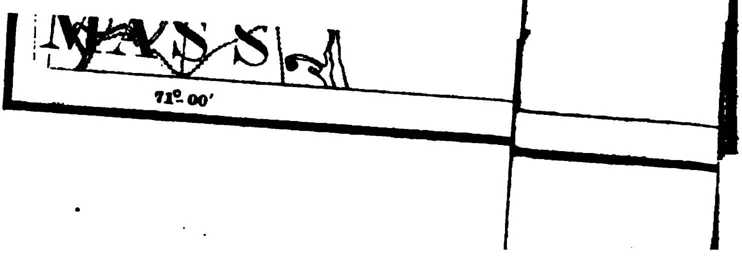


FIRST DISTRICT.

This district extends from the head of navigation on the St. Croix River, Maine, the northeastern boundary of the United States, to and including Hampton Harbor, New Hampshire. It embraces all aids to navigation on the seacoast of Maine and New Hampshire and on all tidal waters between the limits named.

Inspector.—Commander George E. Wingate, United States Navy, to June 30, 1896; since then Commander N. Mayo Dyer, United States Navy.

Engineer.—Maj. William R. Livermore, Corps of Engineers, United States Army.

In this district there are—

Light-houses and beacon lights	67
Day or unlighted beacons	103
Fog signals operated by steam or hot-air engines	13
Fog signals operated by clockwork	19
Fog signal operated by electricity	1
Whistling buoys in position	14
Bell buoys in position	19
Other buoys in position	656
Steamer *Lilac*, buoy tender, and for supply and inspection	1
teamer *Myrtle*, for construction and repair in the First and Second districts	1

The number preceding the name of a light-station is that by which is designated in the list of lights and fog signals on the Atlantic and ulf coasts of the United States, corrected to January 1, 1895, or in e list of lights and fog signals on the Pacific Coast of the United tates, corrected to January 1, 1896, or in the list of lights and fog sigals of the United States on the Northern lakes and rivers, corrected the opening of navigation, 1895.

LIGHT-STATIONS.

1. ***Whitlocks Mill, on the south bank of the St. Croix River, Maine.***—The llowing recommendation, made in the Board's last two annual reports, renewed:

A light was needed at this place to enable the steamers plying between Eastport d Calais, and especially towboats, to make the difficult turn at the Narrows, a few ndred yards above Whitlocks Mill. The Canadian Government maintains two hts on the left or Canadian bank of the river, and another light was needed on the ht or American bank to make the navigation safe at this difficult turn. Hence a red light was, on July 15, 1892, shown from a tree as a temporary expedient. It is now proposed to purchase a site for this light. The owner of the land offers it at a reasonable price. It is estimated that its purchase, together with the legal expenses necessary to obtaining title and cession of jurisdiction, will cost not to exceed $250. Recommendation is made that an appropriation of that amount be made for this purpose.

4. West Quoddy Head, entrance to Quoddy Roads, Maine.—A boathouse and boat slip were built, and a boiler and engine set up to facilitate landing material and supplies. Various repairs were made.

—. *Little River Head fog signal, Maine.*—This is the entrance to Cutler Harbor, which is a station of the Eastport, St. John, and Bay of Fundy pilots. Vessels entering the Bay of Fundy first make Libby Islands and then try to make Little River light. It is a harbor of refuge, and is used as such by vessels when they can get in. This, however, is impossible in thick weather without a more effective fog signal than the bell now on Little River Island. The steamer *Eduardo* was wrecked on Old Man Island in 1889, 2 miles south of Cutler Harbor, and proved a total loss. The crew, numbering 40 in all, were saved. She cost $285,000, and her master stated formally that he was of opinion that the accident would not have occurred had there been a proper fog signal at this point.

The Board recommended the establishment of a fog signal there in five annual reports. It is estimated that the establishment of such a signal would cost $10,500, and an appropriation of that amount is therefore recommended.

7. Libby Islands, entrance to Machias Bay, Maine.—The dwelling was enlarged to make temporary quarters for another keeper. A hoisting engine was set up at the landing. Various repairs were made.

The following recommendation, made in the Board's last annual report, is renewed:

> Since the recommendation of the last three years for an appropriation for a single dwelling for an assistant keeper, it has become necessary to provide quarters for another assistant, making two sets of quarters urgently needed, as there is now but one set for three keepers. It is therefore recommended that a double dwelling be built, at an estimated cost of $6,000, instead of the single dwelling heretofore recommended.

8. Moose Peak, Mistake Island, seacoast of Maine.—A small derrick was put up for landing coal and supplies. Minor repairs were made

12. Petit Manan, seacoast of Maine.—A hoisting engine was set up Various repairs were made.

22. Burnt Coat Harbor, Swan Island, coast of Maine.—The following recommendation, made in the Board's last two annual reports, is renewed:

> This station is situated at the extreme end of the peninsula and is separated from the town by the harbor. In winter the harbor is sometimes filled with ice, so that communication with the town by water can not be relied upon; a roadway for the

First District.

accommodation of the necessary travel between the public road and the light-station is therefore necessary. The owners of the adjacent land offer to convey right of way to the Government at a nominal price. It is estimated that the legal expenses of obtaining title and cession of jurisdiction to the land thus conveyed, together with the cost of building the road needed, will not exceed $500. Recommendation is made that an appropriation of this amount be made therefor.

27. *Eagle Island, seacoast of Maine.*—A boundary fence was built around the reservation. Minor repairs were made.

29. *Heron Neck, on Green Island, East Penobscot Bay, Maine.*—The dwelling, covered way, and fuel house were rebuilt. Various repairs were made.

30, 31. *Matinicus Rock, on Matinicus Rock, off the southern entrance to Penobscot Bay, Maine.*—The following recommendation, made in the Board's last five annual reports, is renewed:

> For more than twenty years, and until recently, the first assistant keeper was the son of the principal keeper, and the two lived together in one dwelling. The resignation of the principal keeper has broken up this arrangement. At this important station, which has two second-order lights and a steam fog signal, a keeper and three assistant keepers are employed. These are the only people living on this rock. Two of the assistant keepers, with their families, live in one double dwelling, and the principal keeper lives in a separate single dwelling. These three sets of quarters are adapted only to the accommodation of three families, and a fourth set of quarters is, therefore, urgently necessary for the third assistant.
>
> It is estimated that a proper dwelling can be built for $3,200, and recommendation is made that this amount be appropriated for that purpose.

32. *Two Bush Island, entrance to West Penobscot Bay, seacoast of Maine.*—The title to the island was acquired by condemnation. Plans and specifications for the buildings were in progress. It is expected that the buildings will be erected this season.

35. *Rockland Breakwater, entrance to Rockland Harbor, Maine.*—On November 25, 1895, the two fixed red lens lanterns were moved to the new beacon at the end of the finished work of the breakwater. A platform and small temporary shelter were built at the end of the pier. Various repairs were made.

36. *Browns Head, entrance to Fox Island Thorofare, Maine.*—The stone wall near the boathouse was rebuilt and the other wall was repaired.

38. *Negro Island, entrance to Camden Harbor, Maine.*—The tower, the workroom, and the covered way were rebuilt. Minor repairs were made.

43. *Marshall Point, entrance to St. George Harbor, Maine.*—The old stone house was demolished and a new wooden dwelling was built on its foundation. The outbuildings were repaired and arranged to suit the conditions of the new dwelling. About 250 feet of fence were rebuilt.

47. *Pemaquid Point, entrance to Johns Bay, Maine.*—A brick oil house was built.

First District.

49. Burnt Island, entrance to Boothbay Harbor, Maine.—A new bell was hung, an automatic striker and fog bell were installed, and minor repairs were made.

52. Pond Island, Kennebec River, Maine.—A new lantern and deck were procured and placed.

53. Perkins Island, Kennebec River, Maine.—The title to the light-house site on this island is nearly ready. Plans and specifications for the buidings were in progress. It is expected to complete the station this season.

54. Squirrel Point, Kennebec River, Maine.—The title to the site is nearly ready. Plans and specifications for the buildings were in progress. It is expected to complete the station this season.

55, 56. Doubling Point range lights, Kennebec River, Maine.—The title to the site is nearly ready. Plans and specifications for the buildings were in progress. It is expected to complete the station this season.

57. Doubling Point, Kennebec River, Maine.—The title to the site is nearly ready. Plans and specifications for the buildings were in progress. It is expected to complete the station this season.

58. Ames Ledge, on the east side of the Kennebec River, about 6½ miles above Bath and at the entrance to the channel on the east side of Swan Island, Maine.—On May 11, 1896, a fixed red lantern light was established.

59. Seguin, off the mouth of the Kennebec River, Maine.—A run, 80 feet long, of hard pine was built, and a hoisting engine was set up. One of the fog-signal boilers was renewed. The characteristics of the fog signal were changed and the apparatus repaired. Minor repairs were made.

61, 62. Cape Elizabeth, on Cape Elizabeth, Maine.—The characteristic of the fog signal was changed. Arrangements were made for supplying sea water to the boilers in case of extended drought.

The following recommendation, made in the Board's last five annual reports, is renewed:

> Until the resignation of the principal keeper, about two years ago, his wife was an assistant keeper, so that there were but three families to be accommodated in the three single dwellings at the station. This arrangement is changed, and there are now four separate families at the station, and two families are crowded into a dwelling adapted in size and arrangement to only one family. The two towers are more than 900 feet apart; two of the dwellings are near the northeast and one near the southwest tower. A fourth dwelling is very urgently needed near the latter to properly and conveniently house in the severe winter weather of that climate the second of the two assistants who attends the light in it. Besides a first and a second order light, the station has a first-class fog signal, and an additional dwelling is imperatively needed in the best interests of the service.
>
> It is estimated that one can be built for $2,000, and it is recommended that an appropriation of this amount be made therefor.

64. Spring Point Ledge, Portland Harbor, Maine.—By the act approved

June 11, 1896, an appropriation of $25,000 was made for finishing the establishment of this station. The contract was made for building the structures and the work was begun. It is expected that on April 1, 1897, this station will be ready for lighting.

65. *Staniford Ledge fog bell buoy, in 17 feet of water, about 300 feet NNE. ½ E. from Portland Breakwater light-house, Portland Harbor, Maine.*—An electric motor and machinery for striking a bell were installed. During the winter months the signal was removed to Portland Breakwater, and when the harbor was again free from ice it was put upon the buoy.

66. *Portland Breakwater, Portland Harbor, Maine.*—Repairs were made to the dwelling, outbuildings, and revolving machine. A fog bell and electric striking machine was set up to replace the signal taken from Staniford Ledge buoy. Various repairs were made.

70. *Boon Island, seacoast of Maine.*—The following recommendation was made in the Board's last five annual reports:

> There are at this station one keeper and two assistants, and but two sets of quarters in one double dwelling. The second assistant keeper has to board either with the family of the keeper or with that of the first assistant keeper. This forced arrangement is unsatisfactory to all, and is quite unfavorable to the retention of a second assistant of the needed qualifications. The station is isolated and exposed, the tower is tall, and this second-order light is an important one.
>
> A third dwelling, which is urgently needed, it is estimated can be built for $3,400. It is therefore recommended that an appropriation of this amount be made therefor.

71. *Whaleback, entrance to Portsmouth Harbor, New Hampshire.*—Part of the boat slip was renewed. The characteristic of the fog signal was changed. Minor repairs were made.

72. *Portsmouth Harbor (Newcastle), entrance to Portsmouth Harbor, New Hampshire.*—A bell house was built at the base of the light-tower and a 1,000-pound fog bell was set up. Various repairs were made.

—. *Jerrys Point beacon light, on the southwest end of the breakwater making off from Jerrys Point, the southeast point of Great Island, and the northerly side of the entrance to Little Harbor, New Hampshire.*—On May 25, 1896, a fixed red lens lantern light was established.

—. *Frosts Point beacon light, on the northeasterly end of the breakwater making off from Frosts Point, southerly side of the entrance to Little Harbor, New Hampshire.*—On May 25, 1896, two fixed white lens lantern lights were established.

75. *Isles of Shoals, New Hampshire.*—The fog signal now on White Island at the Isles of Shoals light is a bell. It falls far short of being adequate to the needs of commerce. A more effective signal is required. It is estimated that this can be established here for $5,500, and it is recommended that an appropriation of this amount be made therefor.

First District.

REPAIRS.

Repairs more or less extensive were made during the year at the following-named stations:

1. Whitlocks Mill, Me.
2. St. Croix River, Me.
3. Lubec Channel, Me.
5. Little River, Me.
6. Avery Rock, Me.
9. Moosabec Reach, Me.
13. Prospect Harbor, Me.
14. Winter Harbor, Me.
15. Mount Desert, Me.
16. Egg Rock, Me.
17. Crabtree Ledge, Me.
18. Baker Island, Me.
19. Great Duck Island, Me.
20. Bear Island, Me.
21. Bass Harbor Head, Me.
23. Blue Hill Bay, Me.
24. Saddleback Ledge, Me.
25. Deer Island Thorofare, Me.
28. Pumpkin Island, Me.
30, 31. Matinicus Rock, Me.
33. Whitehead, Me.
40. Dice Head, Me.
41. Fort Point, Me.
44. Monhegan Island, Me.
45. Manana Island fog-signal station, Me.
46. Franklin Island, Me.
48. Ram Island, Me.
50. Cuckolds fog-signal station, Me.
51. Hendricks Head, Me.
52. Pond Island, Me.
60. Halfway Rock, Me.
63. Portland Head, Me.
67. Wood Island, Me.
69. Cape Neddick, Me.
73, 74. Seavys Island, Me.
85. Isles of Shoals, N. H.

DAY OR UNLIGHTED BEACONS.

The 103 day beacons in this district, with a few exceptions, are in good order.

Shag Rock Tripod, Rockland Harbor, Maine.—A wooden tripod, 57 feet high, the upper half covered with boards, was carried away in January; a temporary tripod, 25 feet high, having the same general appearance as the former one, was erected in its place in February.

Pumpkin Island, Portsmouth Harbor, New Hampshire.—A mast and day mark were put up in July, 1895, in place of one carried away.

Torry Castle, Blue Hill Bay, Maine.—The tripod which was struck by lightning in June, 1895, was repaired.

Northeast Point Ledge spindle, Camden Harbor, Maine.—The spindle was straightened and the day mark was repaired.

Inner Ledges spindle, Camden Harbor, Maine.—The spindle was straightened and reset.

Shag Rock, Rockland Harbor, Maine.—A new tripod was built to replace the one carried away during a storm in December, 1895.

Cow Island Ledge spindle, Saco River, Maine.—The work of replacing the spindle and crib work was begun, and nearly completed.

Fishing Rocks spindle, Kennebunkport, Maine.—A new light and spindle were purchased, and about two-thirds of the work of drilling a new hole was completed.

Ram Island, Kennebec River, Maine.—The action of the Attorney-General as to the validity of title from the State of Maine is awaited.

Channel Rock tripod, eastern entrance to Fox Island Thorofare,

First District.

Maine.—Color changed from white to red to make it a more conspicuous day mark.

Bagaduce River, Maine.—Twenty-four perches were placed in this river, from Castine to Penobscot, Me.

FOG SIGNALS OPERATED BY STEAM OR HOT-AIR ENGINES.

4. West Quoddy Head, Maine.—This 10-inch steam whistle, in duplicate, was in operation some 1,065 hours during the year, and consumed about 55 tons of coal.

7. Libby Islands, Maine.—This 10-inch steam whistle, in duplicate, was in operation some 1,402 hours during the year, and consumed about 63¼ tons of coal.

12. Petit Manan, Maine.—This 10-inch steam whistle, in duplicate, was in operation some 1,513 hours during the year, and consumed about 57½ tons of coal.

15. Mount Desert, Maine.—This third-class Daboll trumpet, in duplicate, was in operation some 1,181 hours during the year, and consumed about 5⅓ tons of coal.

19. Great Duck Island, Maine.—This 10-inch steam whistle, in duplicate, was in operation some 1,071 hours during the year, and consumed about 47⅓ tons of coal.

30, 31. Matinicus Rock, Maine.—The signals of this station, a 10-inch and a 12-inch steam whistle, were in operation some 960 hours during the year, and consumed about 50 tons of coal.

33. Whitehead, Maine.—The 10-inch steam whistle, in duplicate, was in operation some 1,614 hours during the year, and consumed about 67½ tons of coal.

45. Manana Island, Maine.—This first-class Daboll trumpet, in duplicate, was in operation some 799 hours during the year, and consumed about 12 tons of coal.

50. Cuckolds Island, Maine.—This first-class Daboll trumpet, in duplicate, was in operation some 865 hours during the year, and consumed about 4¾ tons of coal.

59. Seguin, Maine.—The 10-inch steam whistles, in duplicate, were in operation 898 hours during the year, and consumed about 40 tons of coal.

61. Cape Elizabeth, Maine.—The signals are a second-class steam siren and a 12-inch steam whistle. The 12-inch steam whistle was in operation some 119 hours during the year, and consumed about 5 tons of coal. The second-order siren was in operation some 465 hours, and consumed about 30 tons of coal.

63. Portland Head, Maine.—This second-class Daboll trumpet, in duplicate, was in operation some 806 hours during the year, and consumed about 11 tons of coal.

First District.

71. Whaleback, New Hampshire.—This third-class Daboll trumpet, in duplicate, was in operation some 818 hours during the year, and consumed about 7 tons of coal.

BUOYAGE.

There were established during the year 28 spar buoys and 6 iron buoys, including Sail Rock whistling buoy, westerly side of the entrance to Quoddy Roads; Jerry Ledge bell buoy, Narraguagus Bay; Old Cilley Ledge bell buoy, off Georges Islands; Clous Ledge bell buoy, Sheepscot River; Seguin Island whistling buoy, off Kennebec River, Maine, and White Island whistling buoy, off Isles of Shoals light-station, New Hampshire. There were discontinued 7 spar buoys and 1 iron buoy, including Clous Ledge bell buoy, Sheepscot River, Maine.

The following changes were made in the coloring and numbering of the buoys in this district, viz:

North Point of Greening Island buoy, Somes Sound, Mount Desert Island, Maine, changed from a red spar No. 10 to a black spar No. 5.

Other changes were made as follows:

The 5 spar buoys above the Middle Ground, in the Pennamaquan River, Maine, which were discontinued, were replaced by perches surmounted by kegs similarly colored.

Jones Ledge bouy, Sorrento Harbor, Frenchmen's Bay, Maine, red spar No. 2, changed to a second-class nun, same color and number.

Sullivan Harbor, Frenchmen's Bay, Maine, Moon Ledge buoy, black spar No. 5, changed to a second-class can, same color and number; Ingalls Ledge buoy, red spar No. 6, changed to a second-class nun, same color and number; Bean Island Ledge buoy, black spar No. 3, changed to a second-class can, same color and number; Dram Island Ledge buoy, red spar No. 2, changed to a first-class nun, same color and number.

Somes Sound, Mount Desert Island, Maine, Myrtle Ledge buoy, a red spar, number changed from 2 to 8; Bar Ledge buoy, a black spar, number changed from 1 to 9; Mason Ledge buoy, a black spar, number changed from 3 to 11.

York Narrows, Maine, Orono Point buoy, black spar No. 1, changed to a second-class can, same color and number; Yard Rock buoy, red and black horizontal-striped spar, changed to a second-class nun, same color and number.

Green Island Ledge buoy, Lariey Narrows, Maine, a red spar, number changed from 8 to 2.

Duck Rock whistling buoy, Two Bush Channel, Maine, was fitted for experimental purposes with an 8-inch Crosby chime whistle, surmounted by a hood.

Jameson Point (Breakwater) buoy, Rockland Harbor, Maine, second-class nun, red No. 4, was moved to a position off the new beacon at the end of the finished work, about 298 feet southerly from the old beacon.

Clous Ledge buoy, Sheepscot River, Maine, black spar No. ½, was changed to a second-class can, same color and number.

Kennebec River, Maine, Perkins Island North Ledge buoy, black spar No. 1, changed to a second-class can, same color and number; a black perch, surmounted by a barrel, with axis horizontal, was placed on Seal Rock, south of Weasel Point.

Haskell Island Reef buoy, Potts Channel, Casco Bay, Maine, black spar No. 1, changed to a second-class can, same color and number.

Old Anthony whistling buoy, off Cape Elizabeth, Maine, a new Crosby chime whistle with a 4-inch pipe into the buoy, and to which the whistle is attached, was fitted to this buoy.

South Beacon Shoal buoy, Portsmouth Harbor, New Hampshire, black spar No. 11, changed to a second-class ice buoy, same color and number.

DEPOTS.

Bear Island, Mount Desert Island, Maine.—The approach to the wharf, about 52 feet long and 20 feet wide, was rebuilt. Minor repairs were made to the wharf and the coal-shed roof.

Little Diamond Island, Portland Harbor, Maine.—The wharf was repaired by renewing 71 bearing piles and posts, 4 snubbing and makefast piles, 265 feet of hard-pine capping, 30,089 feet of the top planking, 2,000 feet of 3-inch spruce covering, and 512 square feet were rebuilt, and other portions of the wharf were raised and repaired. Minor repairs were made to the coal shed and to the keeper's house.

Whitehead, West Penobscot Bay, Maine.—The wharf and coal shed at this station are in good condition.

TENDERS.

The Lilac.—This steel screw steamer was employed throughout the year. She was hauled out in November, 1895, and again in May, 1896, when her bottom was cleaned and painted and minor repairs were made. During the year she was laid up for repairs 12 days, replaced 92 buoys, changed 248, painted 375 buoys and 3 spindles and tripods, landed 184 tons of coal at light-stations, and did 32 days' work at the depots. In doing this she steamed about 18,290 miles and consumed some 1,059 tons of coal.

The Geranium.—This side-wheel steamer, transferred temporarily from the Second light-house district, gave valuable assistance in delivering coal, replacing and painting buoys, etc., from May 3 to July 17, 1896, on which latter date she returned to Boston. She replaced 2 buoys, changed 74, painted 205 buoys and 7 spindles and tripods, worked 2 days at the depot, and in doing this steamed 1,398 miles and consumed 98 tons of coal.

SECOND DISTRICT.

This district extends from Hampton Harbor, New Hampshire, t Elisha Ledge, off Warren Point, Rhode Island, but does not inclu either the harbor or the ledge. It embraces all aids to navigation o the seacoast and tide waters of Massachusetts excepting those on th Taunton River and that part of Mount Hope Bay lying within the Sta boundary.

Inspector.—Commander Francis M. Green, United States Navy.

Engineer.—Maj. William R. Livermore, Corps of Engineers, Unite States Army.

In this district there are—

Light-houses and lighted beacons	7
Light-vessels in position	1
Light-vessels for relief	
Day or unlighted beacons	7
Fog signals operated by steam or hot-air engines	1
Fog signals operated by clockwork	1
Lighted buoys in position (gas)	
Whistling buoys in position	1
Bell buoys in position	1
Other buoys in position	50
Ice buoys for winter use	1
Steamers *Verbena*, *Geranium*, and *Azalea*, buoy tenders and for supply and inspection	
Steamer *Myrtle*, for construction and repair in the First and Second districts	

LIGHT-STATIONS.

78. *Newburyport Harbor, Plum Island, Merrimac River, Massachusetts.*—A fence was built to inclose about 2 acres of land around th light-house buildings. Minor repairs were made.

84. *Straitsmouth, Straitsmouth Island, off Cape Ann, Massachusetts.*—The tower and work-room were rebuilt on the same foundations. Mino repairs were made.

85, 86. *Cape Ann, Thatcher Island, Massachusetts.*—The railroad wa rebuilt in a more favorable location, and a hoisting engine was set u in connection with it to facilitate the landing of coal and supplies a the signal house. One of the fog-signal boilers was replaced by a ne one.

87. *Eastern Point, entrance to Gloucester Harbor, Massachusetts.*—The bell tower was prepared for a more powerful signal, and the work of

2

THIRD DISTRICT.

This district extends from Elisha Ledge, off Warren Point, Rhode Island, to a point on the coast of New Jersey opposite Shrewsbury Rocks, and includes the ledge and the rocks. It embraces all aids to navigation on the coasts of Rhode Island, Connecticut, and New York, and of New Jersey northward of the point opposite Shrewsbury Rocks, and on all tidal waters tributary to the sea or Long Island Sound between the limits named, together with the aids on Whitehall Narrows and on the United States waters of Lakes Champlain and Memphremagog.

Inspector.—Commander A. S. Snow, United States Navy.

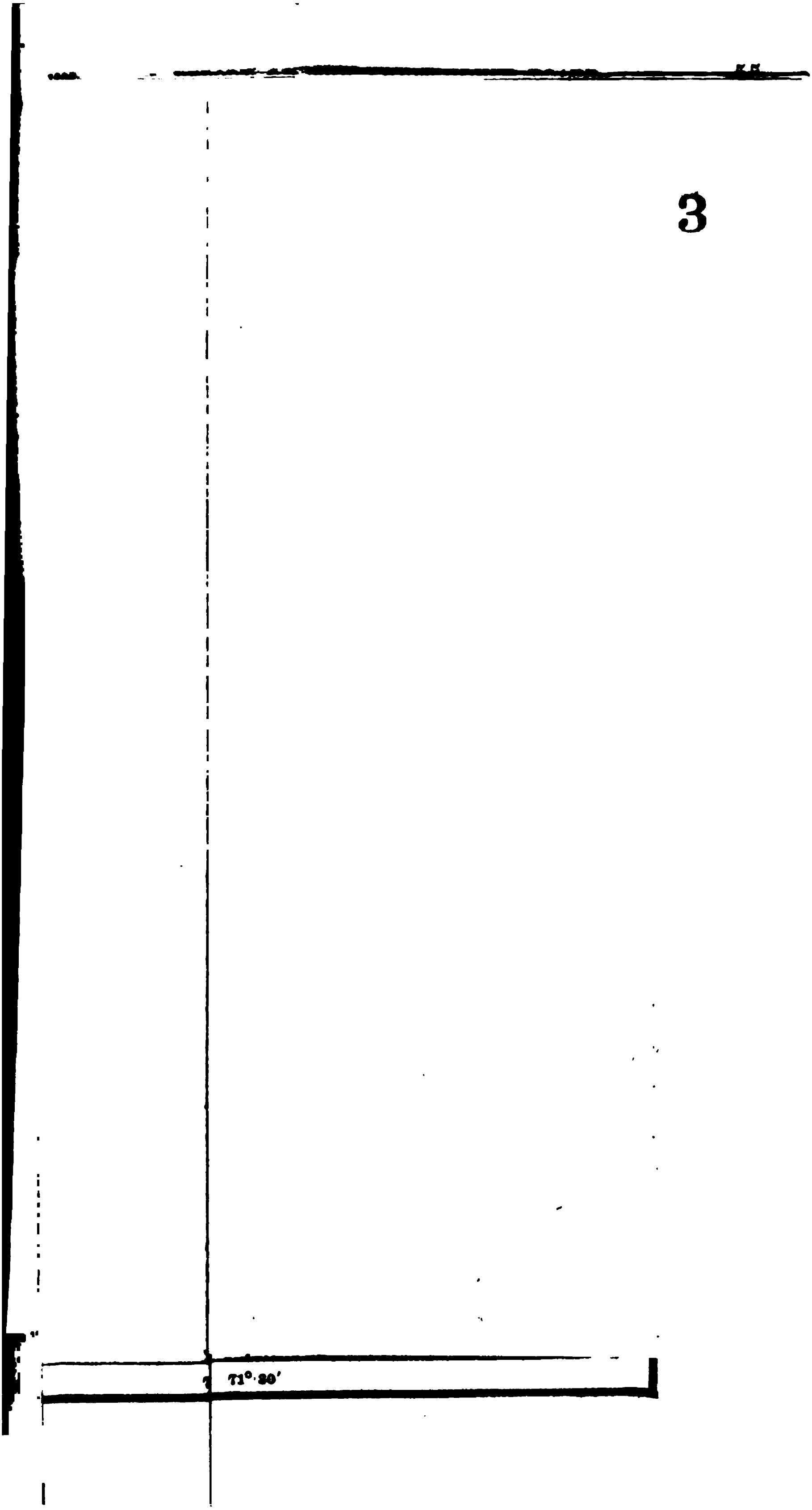
Engineer.—First Lieut. William E. Craighill, Corps of Engineers, United States Army, to October 23, 1895; Maj. Henry M. Adams, Corps of Engineers, United States Army, to May 20, 1895; since then Lieut. Col. William Ludlow, Corps of Engineers, United States Army.

There are in this district—

Light-houses and beacon lights, including 94 post lights	244
Light-vessels in position	7
Light-vessels for relief	3
Day or unlighted beacons	38
Fog signals operated by steam or hot-air engines	16
Fog signals operated by clockwork	52
Electric buoys (new system)	10
Electric buoys (old system)	6
Lighted buoys	3
Whistling buoys in position	5
Bell buoys in position	26
Other buoys in position	583
Steamer *Armeria*, used for supplying the light-stations of the Atlantic and Gulf coasts	1
Steamers *John Rodgers* and *Cactus*, buoy tenders, and for supply inspection of light-stations	2
Steamer *Gardenia*, buoy tender and for freight	1
Steamers *Mistletoe* and *Rose*, used for works of construction and repair of light-stations, fog signals, and day beacons	2
Steamer *Nettle*, for works of construction and repair on Lake Champlain	1
Steam launch *Daisy*	1

LIGHT-STATIONS.

171. Castle Hill, Rhode Island.—On February 27, 1896, the fog bell was reinstalled. A more efficient fog signal was found to be necessary. A bell of 2,400 pounds weight was therefore procured, and it will soon be set in position.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Third District.

178. Plum Beach, Rhode Island.—By the act approved on June 11, 1896, $40,000 was appropriated "for finishing the establishment of a light and fog-signal station at or near Plum Beach, Rhode Island." Contracts for the structures and for the riprap for protecting the site were made. The station is to be completed before the close of navigation this winter.

—. *Hog Island Shoal, Rhode Island.*—The light-vessel near this shoal is old and weak and is scarcely seaworthy. It would cost about $70,000 to replace her. A suitable light-house can be built there for $35,000. The recommendation made in the last annual report, that an appropriation of this amount be made therefor, is renewed.

185. Bristol Ferry, Rhode Island.—About 125 running feet of fence was built and the old fence was repaired.

186. Warwick, Rhode Island.—Some 250 running feet of fence was moved back from the edge of the bank next to the bay to prevent undermining.

188. Conimicut, Rhode Island.—New 4-inch boat davits were set up on west side of pier opposite the small boat landing.

—. *Great Salt Pond Breakwater, Block Island, Rhode Island.*—A Funck lantern light was established on May 30, 1896, on the outer end of the completed portion of the south breakwater entrance to the Great Salt Pond Harbor, Block Island.

202. Stonington Breakwater, Connecticut.—Some 400 tons of riprap stone was placed for the protection of the pier. Various minor repairs were made.

—. *Black Ledge, New London Harbor, Long Island Sound, Connecticut.*—A survey of a portion of the ledge was made with a view of locating the site of the proposed light-house. The following recommendation, which was made in four recent annual reports of the Board, is renewed:

> The necessity for establishing a light and an efficient fog signal in such a position as to enable vessels to enter and leave the harbor of New London, Conn., has become evident, and especially so for the aid of those approaching from seaward.
>
> The numerous outlying shoals and ledges surrounding the entrance to this harbor make the approach to it dangerous in thick weather. The location of the present New London light and fog-signal station is so far inside the obstructions as to be partially ineffective as an aid for the purpose of safe navigation of this entrance. The commerce of the port of New London has so increased since the erection of the present light as to change the conditions materially. In consequence of the recent grounding of the steamer *City of Worcester* on Bartlett Reef, complaint was made that the fog bell of Bartlett Reef light-ship was not adequate to the needs of vessels approaching New London from the westward in a fog, and it was stated that Congress would be petitioned to replace the present light-ship with another carrying a steam fog signal. In view of these facts and the further fact that a naval station is in operation on the Thames River, which empties into New London Harbor, it is suggested that a light and fog-signal station be established on the southwest ledge on the eastern side of the entrance to New London Harbor. Estimate is made that it can be done for $45,000. It is therefore recommended that an appropriation of that amount be made therefor.

Third District.

211. Ice House post light, No. 3, Thames River, Connecticut.—A new dolphin was put up.

215. Long Reach (lower) post light, No. 8, Thames River, Connecticut.—The dolphin which was carried away by ice was replaced.

216. Long Reach (upper) post light, No. 9, Thames River, Connecticut.—The dolphin which was destroyed by ice was replaced.

219. Mohegan Dike post light, No. 14, Thames River, Connecticut.—The dolphin which was carried away by ice was replaced by an iron post.

221. Pride Pier post light, No. 16, Thames River, Connecticut.—The dolphin which was carried away by ice was recovered and repaired.

222. Burnt House Pier post light, No. 18, Thames River, Connecticut.—The dolphin which was swept away by ice was replaced.

224. Sand Pier post light, No. 15, Thames River, Connecticut.—The dolphin which was destroyed by ice was replaced.

227. Race Rock, New York.—Contract was made to furnish and place 400 tons of riprap to protect the pier. Various repairs were made.

228. Little Gull Island, New York.—Some 16 feet of the outer end of the stone landing wharf was rebuilt. About 150 tons of riprap was placed around the head of the wharf to prevent the gravel from washing away. Various repairs were made.

230. Plum Island, New York.—The timber-crib landing wharf was completed and the boathouse was repaired.

—. *Oyster Pond (or Orient) Point, New York.*—The beacon off Oyster Pond or Orient Point, on the west side of Plum Gut, Long Island Sound, was carried away by the ice. It is proposed to replace it with a lighted beacon and fog signal. It is estimated that this will cost $5,000, and it is recommended that an appropriation of this amount be made therefor.

240. Devils Wharf post light, Connecticut River.—The post ironwork and ladder, which had been destroyed by the ice, was renewed.

270. Falkner Island, Connecticut.—The breakwater on the north side of the landing wharf was completed. Various repairs were made.

271. Southwest Ledge, Connecticut.—Some 400 tons of riprap stone were placed to protect the boat landing and pier. Minor repairs were made.

—. *New Haven Harbor Breakwater, Connecticut.*—The Government works of improvement to this harbor are now nearly completed, and it is necessary to place a light on the outer breakwater, not only to guide into the harbor, but to prevent vessels from collision with the breakwater itself. It is estimated that this light and fog signal can be established for a sum not exceeding $45,000, and it is recommended that an appropriation of this amount be made therefor.

273. Stratford Point, Connecticut.—A survey was made of the lighthouse site and the boundaries were properly established and marked.

274. Stratford Shoal, New York.—Some 500 tons of riprap stone were placed for the protection of the pier. Various repairs were made.

Third District.

—. *Port Jefferson Harbor, New York.*—The east breakwater light and fog-bell signal pier was completed A bell tower was erected and the small house built to protect the fog-signal apparatus was nearly completed. Some 900 tons of riprap were delivered for the protection of the site. On August 10, 1896, this station is to go into operation. The west beacon light concrete pier was completed and the post was erected June 30, 1896. On August 10, 1896, the light was shown for the first time.

277. Bridgeport Breakwater, Connecticut.—A landing wharf was built for small boats.

280. Norwalk Island, Connecticut.—Some 75 running feet of new picket fence was built and 200 feet of old picket fence was repaired. The gutters and leaders on the dwelling were overhauled and 124 feet of boat ways was built.

—. *Norwalk Harbor, Long Island Sound, Connecticut.*—The proposed improvements to the aids to navigation in this harbor are rendered necessary by the important commercial interests of this port and the progress with works of harbor and channel improvement in this vicinity which are being prosecuted by the Government. It is proposed, therefore, to establish a light and fog-signal station on Greens Ledge, Norwalk Harbor, which it is estimated will cost $60,000. It is recommended that an appropriation of this amount be made therefor.

It is also proposed to establish a light and fog-signal station on Pecks Ledge, Norwalk Harbor. It is estimated that this can be done for a sum not exceeding $10,000, and it is recommended that an appropriation of this amount be made therefor.

It is also proposed to establish a light on Long Beach Day Beacon, Norwalk Harbor. It is estimated that this work can be done for $2,500, and it is recommended that an appropriation of this amount be made therefor.

It is further proposed to establish lighted beacons at Round Beach, Fitchs Point, White Rock Reef, and Grassy Hammock, Norwalk Harbor, Connecticut. It is estimated that these beacons can be established for a sum not exceeding $600, and it is recommended that an appropriation of this amount be made therefor.

287. Great Captain Island, New York.—A new fence was built on the west line of the light-house site. Various repairs were made.

288. Jones Rocks beacon, Connecticut.—The structure was completed on October 2, 1895, and the light was exhibited November 9, 1895, for the first time.

289. Port Chester beacon, New York.—The erection of the structure was completed on October 29, 1895, and the light was exhibited on November 18, 1895, for the first time.

290. Execution Rocks, New York.—Some 600 tons of riprap stone for the protection of the site was delivered under contract. Various repairs were made.

Third District.

Hart Island, Long Island Sound, New York.—The red sector shown from Execution Rocks light-station was established to guide vessels clear of the southern end of Hart Island. As this light is about 2½ miles distant from Hart Island, it fails of its object in thick weather. The proposed fog signal is needed by the extensive commerce using the eastern entrance to New York Harbor. It is estimated that it can be established for $2,500, and it is recommended that an appropriation of this amount be made therefor.

292. Stepping Stones, New York.—A contract was made in June for the delivery of 300 tons of riprap stone for the protection of the site. Various repairs were made.

293. Throgs Neck, New York.—An oil house was built.

308, 309. Navesink, New Jersey.—Some 448 running feet of wire fence and about 154 running feet of picket fence was built.

326. Sandy Hook main light—327. South Hook beacon, New Jersey.—Electric wires were laid from the electric power house to these stations. A 150-candlepower electric lamp was exchanged for the 77-candlepower oil lamp at the main light, and a 100-candlepower electric lamp for a 50-candlepower oil lamp at the south beacon. These were connected with the light-house electric system in operation at Sandy Hook. The lamp supports were so arranged that oil lamps can be readily substituted for the electric lamps in case of need. The light from the electric lamps was exhibited for the first time in each case on May 9, 1896, and since that date they have worked well. Further details are given in connection with the description of the Gedney Channel electric-buoy system.

—. *Southwest Spit, New York Harbor, New Jersey.*—The work of improving the main ship channels at the principal entrance to New York Harbor has now reached such a stage of progress as to require additional aids to navigation to render these channels safe and fully available for the larger vessels at night and during thick weather. It is estimated that a light and fog-signal station can be established here for a sum not exceeding $50,000, and it is recommended that an appropriation of this amount be made therefor.

334. Point Comfort beacon, New Jersey.—The west jetty was completed by contract on June 19, 1896. Work is about to be resumed on the east jetty. No work was done on it since December, 1895. It is proposed to lay a line of riprap between the jetties at about high-water mark as additional protection to the foundations of the station.

336. Old Orchard Shoal, New York.—A fog-signal engine, with blower, blast, device, and horn, was installed ready for test. Some 1,000 tons of riprap stone was placed for the protection of the site. Various repairs were made.

—. *West Bank, New York Lower Bay, New York.*—The work of improving the main ship channels at the principal entrance to New York

Third District.

Harbor has now reached such a stage of progress as to require additional aids to render these channels safe and fully available for the larger vessels at night and during thick weather. It is estimated that a light and fog-signal station can be established here for a sum not exceeding $50,000, and it is recommended that an appropriation of this amount be made therefor.

344. Coney Island, New York.—The structure originally erected for the Coney Island front beacon being no longer needed was removed to the general light-house depot. The site upon which it stood is to be sold at public auction. Minor repairs were made.

346. Fort Tompkins, New York.—By the act approved June 11, 1896, an appropriation of $1,500 was made for the removal of this light to an angle of the stone fort at Fort Wadsworth, and for the establishment there of a fog signal. This work will be done as soon as practicable.

347. Robbins Reef, New York.—A Hornsby-Akroyd oil engine has been substituted for the Priestman engine for operating the blower siren.

349. Governors Island post light, New York.—The fog signal was repaired and new roof was put on. The building stands under the wall of Castle William, which is used as a saluting battery, and is extensively damaged and partly blown into the water whenever a salute is fired.

351. Corner Stake, New Jersey.—The crib was surmounted by a small lamp house and post.

354. Jeffreys Hook post light, New York.—The following recommendation, which was made in the Board's last annual report, is renewed:

> A larger light and a fog bell here would be valuable aids to navigation. The point extends well out into the river, with deep water close to its outer end. The usual route of steamers passing up or down the river is close to the point. The present post light should be replaced by a new structure, upon which should be the lantern with the bell below. It is estimated that these could be established on land to be acquired for the purpose for say $3,000, and it is recommended that an appropriation of this amount be made therefor.

355. Tarrytown, New York.—A contract was made for delivering and placing 200 tons of riprap stone for the protection of the pier.

356. Rockland Lake, New York.—A machine fog bell was installed. Contract was made for delivering and placing 1,000 tons of riprap stone for the protection of the site, as the 18 and 20 foot contours were approaching the tower.

—. *Iona Island, Hudson River, New York.*—The post light at this station is of no service during thick weather. A fog signal is needed during fog in addition to the light by the important commerce of this river. It is estimated that a fog signal can be established here for a sum not exceeding $1,200, and it is recommended that an appropriation of this amount be made therefor.

—. *Esopus Island, Hudson River, New York.*—A post light is now maintained at this point, but a fog signal is required in addition during thick weather by the important commerce of this river. It is estimated that a proper fog signal can be established here for a sum not exceeding $1,200, and it is recommended that an appropriation of this amount be made therefor.

364. *Rondout, New York.*—Contract was made for placing 200 tons of riprap stone about the site. Minor repairs were made.

370. *Green Flats post light, New York.*—The dolphin was replaced.

373. *Catskill (West Flats) post light, New York.*—The post was repaired and replaced.

374. *Percy Reach post light, New York.*—The post was replaced.

375. *Hudson City, New York.*—Contract was made for placing 200 tons of riprap stone for the protection of the pier. Minor repairs were made.

377. *West Flats post light, Hudson River, New York.*—A new post was erected in place of one carried away, and the substructure was repaired.

380. *Coxsackie, East Flats, New York.*—A new dolphin was erected.

381. *Coxsackie, New York.*—Some 98 feet of pier rail was repaired and rebuilt. A new boat and wood house was built. Contract was made for placing 200 tons of riprap for the protection of the site.

1034. *Whipple Point, Vermont.*—A new crib pier was built to replace the cluster of piles which was destroyed by a gale on December 26, 1895.

1037. *Rouse Point Pierhead, New York.*—The mast destroyed by the ice was rebuilt.

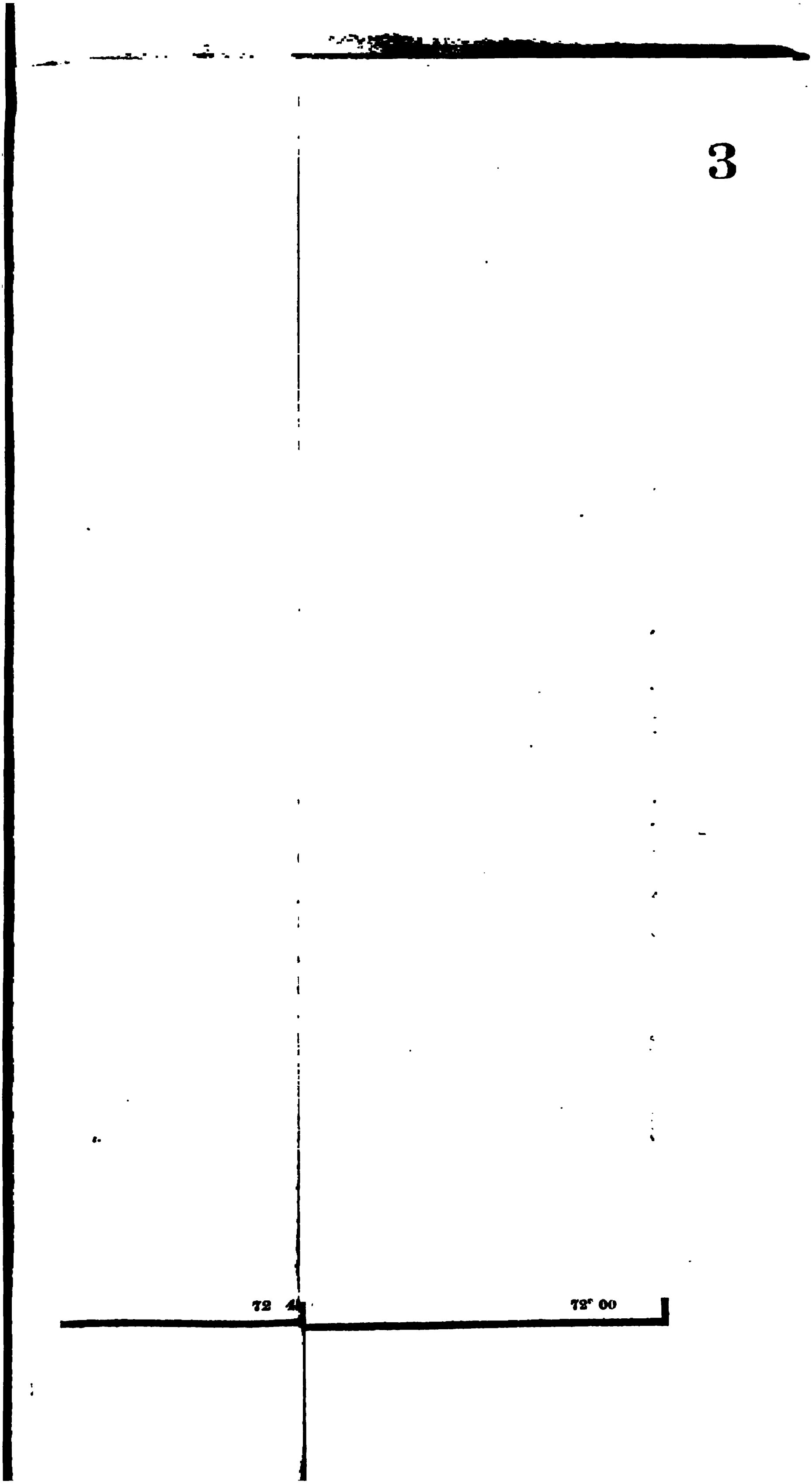
1041. *South Hero, Vermont.*—A new mast was set up. Various repairs were made.

1048. *Burlington Breakwater North Extension Pierhead (north end), Vermont.*—The beacon blown from the pier last winter was repaired by contract, the pier was leveled up, and the beacon was replaced and fastened.

REPAIRS.

Repairs more or less extensive were made at the following-named stations:

168. Sakonnet, R. I.
170. Beavertail, R. I.
172. Fort Adams, R. I.
173. Lime Rock, R. I.
174. Newport Harbor, R. I.
175. Rose Island, R. I.
176. Dutch Island, R. I.
177. Gull Rocks, R. I.
180. Conanicut Island, R. I.
181. Wickford Harbor, R. I.
182. Prudence Island, R. I.
184. Mussel Bed Shoals, R. I.
187. Borden Flats, Mass.
189. Bullock Point, R. I.
190. Sabine Point, R. I.
193. Sassafras Point, R. I.
194. Whale Rock, R. I.
195. Point Judith, R. I.
196. Block Island (N.), R. I.
199. Block Island (SE.), R. I.
200. Watch Hill, R. I.
201. Montauk Point, N. Y.
203. Latimer Reef, N. Y.
205. Morgan Point, Conn.
206. North Dumpling, N. Y.
207. New London Harbor, Conn.
231. Long Beach Bar, N. Y.
232. Cedar Island, N. Y.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Third District.

233. Saybrook Breakwater, Conn.
234. Saybrook (Lynde Point), Conn.
275. Old Field Point, N. Y.
276. Bridgewater Harbor, Conn.
278. Black Rock, Conn.
279. Penfield Reef, Conn.
282. Lloyd Harbor, N. Y.
284. Stamford Harbor, Conn.
291. Sands Point, Conn.
294. Whitestone Point post light, N. Y.
298. North Brother Island, N. Y.
302. Hell Gate post light, N. Y.
305. Fire Island, N. Y.
328. North Hook beacon, N. J.
332. Conover beacon, N. J.
333. Chapel Hill beacon, N. J.
335. Waackaack beacon, N. J.
338. New Dorp beacon, N. Y.
339. Princess Bay, N. Y.
340. Great Beds, N. J.
348. Liberty Enlightening the World, N. Y.
352. Passaic, N. J.
353. Elbow beacon, N. J.
357. Stony Point, N. Y.
363. Esopus Meadows, N. Y.
369. Saugerties, N. Y.
382. Stuyvesant, N. Y.
384. New Baltimore post light, N. Y.
1036. Windmill Point, Vt.
1038. Isle La Motte, N. Y.
1042. Cumberland Head, N. Y.
1043. Gordon Landing Pierhead, Vt.
1044. Plattsburg Breakwater (NE.), N. Y.
1045. Plattsburg Breakwater (SW.), N. Y.
1046. Bluff Point, N. Y.
1047. Colchester Reef, Vt.
1050. Burlington Breakwater south beacon, Vt.
1051. Juniper Island, Vt.
1052. Split Rock, N. Y.
1055. Crown Point, N. Y.

LIGHT-VESSELS.

169. *Brenton Reef light-vessel, No. 11, entrance to Narragansett Bay, Rhode Island.*—This vessel received paint, lime, a new stove, ship chandlery, rations, and fuel.

183. *Hog Island Shoal light-vessel, No. 12, Narragansett Bay, Rhode Island.*—The old vessel now on this station will be wholly unfit for service after the present year without extensive repairs. The Board, in its estimates for special appropriations in the annual report for last year, recommended an appropriation of $35,000 for the establishment of a light-house and fog signal on this shoal. The appropriation was not made, and further action in the matter is therefore postponed. The recommendation for the establishment of the light and fog-signal is renewed, as noted elsewhere, on the grounds both of economy and advantage.

204. *Ram Island Reef light-vessel, No. 23, Fishers Island Sound, Long Island Sound, New York.*—Repairs were made to this vessel's wale plank on the outside and to both of her boats. She received cooking utensils, paint, crockery, spars, and ship chandlery.

226. *Bartlett Reef light-vessel, No. 13, off New London, Long Island Sound, Connecticut.*—This vessel received sails, paint, crockery, ship chandlery, cooking utensils, and a cabin stove.

268. *Cornfield Point light-vessel, No. 48, off the mouth of Connecticut River, Long Island Sound, Connecticut.*—The hull of this vessel is composite, with steel frames, wood planking sheathed with oak, and metal sheathing outside. She was taken off her station May 20, repaired, and returned to it on July 2. Her place was filled by relief ship No. 20.

Her fog signal is a 10-inch steam whistle. She received ship chandlery and minor supplies.

306. Sandy Hook light-vessel, No. 51, off the entrance to New York Bay, New York.—This vessel was taken from her station on May 10, 1896, when she was repaired, and returned to it on July 8. Relief light-vessel No. 16 was on duty in her place. A new evaporator of the Baird pattern was put in. The hull of this vessel is of steel, and is now in a state of thorough repair. She has a propeller for movement under steam, shows an electric light, and has a 12-inch steam whistle for operation during fog. Her occulting electric light continues to give to navigators that special service of distinction which they hailed with satisfaction when it was installed last year. Her electric plant, consisting of two Sherman-Houston D. 7½ compound dynamos, driven by two 8-horsepower Ideal engines, operated properly, and the light was exhibited every night. The difficulties apprehended from the necessity of frequent cleaning and painting, from her comparatively large consumption of coal and from other peculiarities of such a ship, have disappeared before the measures taken to provide for her needs. She received during the year electric and engineers' supplies, a new galley, ship chandlery, and minor supplies.

307. Scotland light-vessel, No. 7, off Sandy Hook, entrance to New York Bay, New York.—This wooden vessel received small repairs on her station, which will suffice until she can be brought in before winter. She received during the year ship chandlery and minor supplies.

The experiments carried on by Prof. Lucien I. Blake, of the Kansas State University, to establish telephonic communication between this ship and the electric power-station at Sandy Hook, formed the subject of a special report to the Light-House Board last year. At the time of the Professor's departure he was trying to devise a practicable calling method by which they could operate a bell or other alarm at either end. The problem presented many difficulties in itself, as well as in connection with devices of limited resource. The experiments in this direction were intrusted to Mr. Eugene W. Caldwell, who worked on them up to July 31, 1895. He designed a ratchet relay to ring a bell when operated by the calling current from shore to ship, and then further experiment was suspended.

—. *Light-vessel No. 58, off Fire Island, Atlantic Coast of Long Island, New York.*—The principal ocean and coast steamship owners, agents, masters, pilots, and underwriters petitioned the Light-House Board to establish a light-ship with a steam fog signal in place of the whistling buoy off Fire Island, New York. Among the reasons given were the inutility of soundings to indicate location, the insufficiency of whistling buoys, the security at this critical point which a light-vessel alone could give, and the value of regular steamers ($13,000,000) bound for New York every week, to say nothing of their cargoes, and the number of incoming passengers from the north of Europe, averaging 450,000 yearly. The accident to the steamer *St. Paul* was mentioned to show that "any vessel having overrun her distance may approach the dangerous New Jersey coast." The Board therefore recommended that an appropriation of $80,000 be made for constructing, equipping, and outfitting complete for service off Fire Island, New York, a first-class steam light-vessel with steam fog signal. An appropriation of $40,000 was made for the purpose by the sundry civil appropriation act approved June 11, 1896, and a contract for the amount of $80,000 was authorized. In the meantime light-vessel No. 58 will soon be placed about 9.7 nautical miles south (magnetic) from Fire Island light-house. She will show two white lights, and her 12-inch steam chime fog whistle will be distinctive in its blasts. The vessel is now at the general light-house depot, where she is being cleaned, painted, and equipped for her new station. Officers for the vessel have been selected and her crew are being shipped.

The proper measures have been taken for the construction of the new light-vessel, for which $40,000 was appropriated, and for which the Board was authorized to contract to an amount not exceeding $80,000, and it is now recommended that $40,000 more be appropriated with which to finish this vessel.

NOTE.—Light-vessel No. 58 was moored off Fire Island on July 15, 1896.

—. *Relief light-vessel, No. 20.*—This vessel was on duty off Cornfield Point, Long Island Sound, as the relief of light-vessel No. 48, from May 20 to July 2, 1896. She is ordinarily kept at the New London depot for duty as relief in the eastern section of the district.

—. *Relief light-vessel, No. 16.*—This vessel was on duty off Sandy Hook as the relief of light-vessel No. 51, taken off for repairs from May 10 to July 8, 1896. The hull is of wood and was rebuilt in 1883. She is kept at the general light-house depot for duty as the relief of No. 51, but hereafter she will have to perform similar service for light-vessel No. 58, off Fire Island.

—. *Relief light-vessel, No. 19.*—This old and worn-out vessel could not be fitted for even temporary service except at a cost which it would be injudicious to incur. She is kept at the New London light-house depot, where she occupies needed space.

DAY OR UNLIGHTED BEACONS.

All the day beacons in the district were painted during the year.

Rose Island (south), Narragansett Bay, Rhode Island.—A spindle and cage. The spindle is bent and the cage missing. Repairs will be made.

Halfway Rock, Narragansett Bay, Rhode Island.—A spindle surmounted by a barrel. The barrel was carried away; it will be replaced.

Third District.

Goat Island Shoal dolphin, Newport Harbor, Rhode Island.—A clump of five piles. An incandescent electric light is maintained on this beacon by the Old Colony Steamboat Company.

Pomham beacon, Providence River, Rhode Island.—A stone tower surmounted by a black ball. The ball is gone; it will be replaced.

Castle Island beacon, Bristol Harbor, Rhode Island.—A stone tower surmounted by a red ball. The ball was carried away; it will be replaced.

Allen Rock beacon, Warren River, Rhode Island.—A tower surmounted by an iron pointer. The tower and pointer are gone. A small wooden building on the stone foundation is the mark at present.

Sugar Reef, Fishers Island Sound, Connecticut.—An iron spindle with a conical cage. The cage is gone; it will be replaced.

East spindle, Fishers Island Sound, Connecticut.—An iron spindle with a cask. The spindle is bent and the cask gone; it will be repaired.

Wicopesset Rock, Lords Passage, Fishers Island, Connecticut.—An iron spindle with a cask. The spindle is bent and the cask is gone; repairs will be made.

Potter (or Seaflower) Reef Beacon, Fishers Island Sound, Connecticut.—A square granite structure surmounted by an iron spindle and cage. The beacon was rebuilt in December, 1895, and 200 tons of riprap stone were placed by contract for its protection. Contract was made for placing about 200 additional tons of riprap.

Oyster Pond Reef, on the Eastern Rock, off Orient Point, Long Island, New York.—A cast-iron cylinder, filled in with concrete, surmounted by an iron shaft and square cage. The beacon was destroyed. The question of its repair is held subject to one for the erection of a light and fog signal at this point.

FOG SIGNALS OPERATED BY STEAM OR HOT-AIR ENGINES.

170. Beavertail, Rhode Island.—The 10-inch steam whistle, with Crosby automatic signal, was in operation about 520 hours during the year, and consumed some 51 tons of coal.

195. Point Judith, Rhode Island.—The first-class steam siren, in duplicate, was in operation about 801 hours, and consumed some 60 tons of coal.

199. Block Island (southeasterly), Rhode Island.—The first-class steam siren, in duplicate, was in operation about 856 hours, and consumed some 47 tons of coal.

201. Montauk Point, New York.—The first-class Daboll trumpet, worked by caloric engines, in duplicate, was in operation about 708 hours, and consumed some 5 tons of coal.

207. New London Harbor, Connecticut.—The first-class Daboll trumpet, in duplicate, was in operation about 734 hours during the year, and consumed some 9 tons of coal.

Third District.

238. *Little Gull Island, New York.*—The second-class steam siren, in duplicate, was in operation about 687 hours during the year, and consumed some 39 tons of coal.

268. *Cornfield Point light-vessel, No. 48, Connecticut.*—The 10-inch steam whistle was in operation about 459 hours, and consumed some 108 tons of coal.

270. *Falkner Island, Connecticut.*—The 10-inch steam whistle, in duplicate, was in operation about 450 hours during the year, and consumed some 41 tons of coal.

274. *Stratford Shoal (Middle Ground), New York.*—The second-class Daboll trumpet was in operation about 363 hours, and consumed some 4 tons of coal.

279. *Penfield Reef, Connecticut.*—The Daboll trumpet, in duplicate, was in operation about 348 hours, and consumed some 2 tons of coal.

281. *Eatons Neck, New York.*—The second-class steam siren, in duplicate, was in operation about 596 hours during the year, and consumed some 42 tons of coal.

287. *Great Captain Island, New York.*—The 10-inch steam whistle, Crosby automatic, in duplicate, was in operation about 380 hours during the year, and consumed some 40 tons of coal.

290. *Execution Rocks, New York.*—The first-class automatic steam siren, in duplicate, was in operation about 295 hours during the year, and consumed some 42 tons of coal.

306. *Sandy Hook light-vessel, No. 51, New York.*—The 12-inch steam whistle, Crosby automatic, in duplicate, was in operation about 380 hours, and consumed some 40 tons of coal.

328. *North Hook beacon, Sandy Hook, New Jersey.*—The first-class automatic steam siren, in duplicate, was in operation about 921 hours during the year, and consumed some 60 tons of coal.

347. *Robbins Reef, New York Harbor.*—The blower siren was in operation about 243 hours during the year, and consumed some 64 gallons of oil.

BUOYAGE.

The weather during the past winter was very cold at intervals, but not so uniformly severe, except for short periods, as to cause a heavy loss of buoys and appendages; in fact, the electric buoys were the only ones seriously disturbed. By comparison with previous years, however, the loss was considerable, and amounted to $3,334.45.

There were lost 2 bell buoys, 2 bridles, 1 whistling buoy complete, 1 first-class can buoy, 1 first-class spar buoy, 38 second and third class spars, 41 shackles of different sizes, 5 first-class sinkers, 44 stone sinkers, 5 ballast balls, 45 fathoms 1-inch chain, 180 fathoms 1¼-inch chain, and 20 fathoms 1½-inch chain.

A much larger number of buoys and appendages were swept away, but the rest were recovered by the tenders, which on every-trip keep a lookout for derelicts afloat or ashore.

As a special service, five second-class can buoys were placed in October, 1895, for the trial course of the United States harbor-defense ram *Katahdin*, and were removed in December.

ELECTRIC-LIGHTED BUOYS AND BEACONS AT GEDNEY CHANNEL AND SANDY HOOK, MAIN ENTRANCE TO NEW YORK HARBOR.

On July 1, 1895, the new buoys lighted with electric lamps operated by the alternating-current system were definitely established, to mark the lower entrance to the harbor. This new system consists of ten spar buoys, each with a 50-candlepower incandescent lamp protected by a thick glass globe mounted at the top with a transformer secured near the head of the buoy just below the lamp. The primary coils of the transformer are connected in parallel between the core of the cable and its copper armor, which latter is uninsulated, and serves as an earth to form with the cable core the complete circuit.

A step-up transformer at the generating station raises the pressure or voltage from 100 volts at the terminals of the generator to 1,000 volts, the line pressure, and this is reduced again to 100 volts at the lamp terminals by the buoy transformers. The generator is run so as to give about 40 cycles per second. Copper instead of iron armor wires are used for the cable in order to reduce inductance. The details of the new system were fully described in the last annual report.

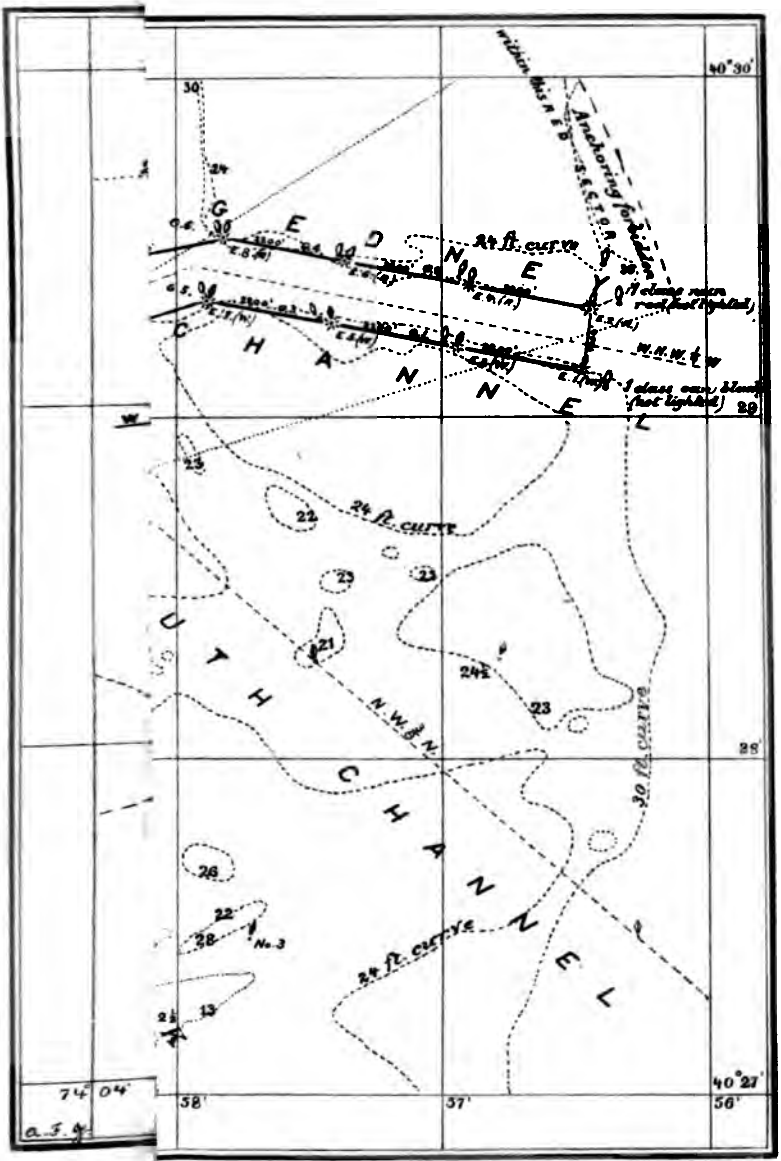
The old system of buoys operated by a continuous current conveyed through iron-armored cables was left in place as a reserve in case of accident to the new system.

The alternating current system has many decided advantages over the former one, principally in the first cost of cable and in the facility with which the lighter cable can be raised, handled, and repaired. The efficiency of the new system in ordinary operation is also greater, but the difficulties arising from ice, from collision by passing vessels, and from disturbance of the cables by vessels' propellers and anchors have continued to be serious, as was to be expected, since the improvements were not directed to the remedying of these defects.

The frequency of the interruptions and the cost of repairs do not seem to have been materially reduced as yet, though in these respects there will no doubt be an improvement with increased experience.

The old or continuous current system of buoys was in operation for a total of 76 nights while the new system was out of order from various causes. The new system was in operation for the remainder of the time except on 2 nights, when both systems were inoperative.

The demands of commerce at this port are such as to render the lighting of the channels imperative, and under these circumstances the expense of the present lighted-buoy system is justifiable, and in fact economical.



THE NORRIS PETERS CO. PHOTO-LITHO. WASHINGTON, D. C.

Third District.

An incandescent electric lamp of 100 candlepower has been in operation in the north beacon at Sandy Hook since August 16, 1889, the current being supplied from the generating station that operates the buoy lamps. The illuminating apparatus in this beacon is fixed white of the fourth order with a fixed red sector covering the cables leading to the Gedney Channel buoys.

During the year similar lamps have been established in the Sandy Hook main light, third-order fixed white, and in the South Hook beacon, sixth-order fixed white. The connection to these lights is made through about 4,000 feet of single conductor steel-armored cable, the core and armor being used to form the circuit. The cable is laid partly in the sand on shore and partly under water. As in the buoy cables, the primary current has a pressure of 1,000 volts, which is reduced by transformers in the lights to 100 volts.

The new lamps in the main light-house and in the South Hook beacon were started on May 8, and have been in regular operation since that date. In all the shore lights the oil lamps formerly used are held in readiness for use in case of failure of the electric system. Since the establishment of the electric lights on shore 50-candlepower lamps have been substituted for the 100-candlepower lamps on the buoys on account of the limited capacity of the generating plant.

One hundred-candlepower lamps are used in the North and South Hook beacons, while that in the Sandy Hook main light is of 150 candlepower.

The accompanying sketch shows the present arrangement of the entire system.

The number of vessels using Gedney Channel for the fiscal year 1895–96, and since the date of establishing the electric buoys, is shown by the following tables:

Number of vessels using Gedney Channel, New York Lower Bay, between sunset and sunrise, in the fiscal year 1895–96.

Fiscal year and month.	Bound in.	Bound out.	Total.
1895.			
July	6	27	33
August	50	7	57
September	46	5	51
October	71	30	101
November	61	32	92
December	65	39	104
1896.			
January	46	22	68
February	51	19	70
March	46	31	77
April	40	9	49
May	46	10	56
June	14	8	22
Total	542	239	780
Average per month	45.1	19.9	65

Third District.

Synopsis showing the number of vessels using Gedney Channel at night, since the installation of the electric-buoy plant November 7, 1888.

Fiscal year.	Number of vessels.			Average per month.		
	Bound in.	Bound out.	Total.	Bound in.	Bound out.	Total.
1888-89 (seven months)	171	53	224	24.4	7.6	32
1889-90	377	192	569	31.4	16	47.4
1890-91	470	297	767	39.1	24.7	63.9
1891-92	533	252	785	44.1	21	65.4
1892-93 (ten months only)	487	215	702	48.7	21.5	70.2
1893-94	648	347	995	54	28.9	82.9
1894-95 (eleven months only)	561	286	847	51	26	77.
1895-96	542	238	780	45.1	19.9	65

The falling off in the number of night passages through Gedney Channel during the past year is attributed to the unusual prevalence of ice and fog.

DEPOTS.

Tompkinsville, Staten Island, New York Harbor.—This is to a large extent a general supply, manufacturing, and repair depot for the entire service, as well as the main depot for the Third district. The location at the commercial metropolis, with superior facilities for transportation, renders it advantageous to purchase here under contracts a large part of the oil and other illuminating materials, of the tools, implements, and the great variety of general supplies required in maintaining the fixed and floating aids to navigation, the tenders, and the service in general.

The manufacturing establishments for making and repairing illuminating and fog-signal apparatus, oil cans and boxes, and for carrying on experimental and other work, which can not be done advantageously in the several light-house districts, are also located at the Staten Island depot. The supplies and manufactured articles are here tested and placed in store, to be packed, and distributed as required by the supply steamer and the district tender, as well as by the convenient lines of land and water transportation when the latter methods are more advantageous.

Under the appropriation of $25,000 made in the act of March 2, 1895, for continuing the improvements to the wharves and the basin, the general progress was as follows:

The new south wharf was completed under contract in January, 1896, and the work of removing the old south wharf was begun in April, 1896. It was nearly completed at the close of the year.

Sheet piling, new fender piles, and waling strips were placed along the east face of the north wharf, and the storehouse on it was moved back a short distance.

Contracts were made for a temporary breakwater to partly close the opening to the basin and intercept the seas in easterly winds, for sheet piling along the south face of the south wharf, for painting the ironwork of the north wharf and the outer end of the south wharf, and for the completion of the wall along the bulkhead line of the entire water front of the Government property. When this work is completed and the filling behind it is completed the available area of the yard will be materially increased.

Concrete pavement about the oil house was laid, material procured for constructing brick pavement in the roads, the sewerage system improved, and arrangements made for extensive dredging to increase the depth of water in the basin. The work of receiving, testing, storing, packing, and shipping the oil and general supplies, and the manufacture, repair, and testing of illuminating and fog-signal apparatus, upon all of which the standard of the service at large is greatly dependent, was effectually and economically performed.

Experimental work was continued in accordance with the general policy of submitting to practical test any new materials, appliances, or methods that may give promise of advantageous use in the Light-House Service. The experiments related mainly to fog-signal machinery and to illuminating apparatus and material.

The progress with the work of rebuilding the wharves during the year has been such as to give reason to expect that with the appropriation now available a sufficient provision for continuing the work, proper accommodations for the tenders and spare light-vessels, and necessary facilities for handling the supplies and manufactured articles that pass through the depot, will be provided at no distant date.

The approaching completion of this part of the work of adapting the general depot to the growing requirements of the service makes more conspicuous the present indadequate and unsafe accommodations for the supply and manufacturing departments, and for the office force.

The buildings now used for these purposes are in many cases cheap wooden structures erected at various times from urgent necessity, and the present condition of the establishment is largely the result of irregular and spasmodic growth with no systematic arrangement. The ground area, which is limited at best, has been still further restricted by these one-story structures, which besides having very limited storage room for the ground space they occupy, are a standing menace to the whole depot on account of their inflammable character. Even the building used for storing the mineral oil, of which as much as 165,000 gallons has been in store at one time, is a one-story wooden building. The business of manufacturing and testing illuminating and fog-signal apparatus and materials and of oil cans and boxes has far outgrown the accommodations afforded by the buildings in which these operations are conducted. The removal of all structures built of inflammable material and the erection in their stead of two fireproof buildings for storage and manufacturing purposes ase urgent needs of this depot. The new buildings should be designed to give ample capacity, and at the same time afford a large clear area in the yard for storage and handling of buoys and other bulky and heavy articles. An enlargement of the present office building is also urgently required.

It is estimated that $25,000 can be properly expended during the coming fiscal year in continuing the improvements to the grounds and buildings, the construction of the sea wall, the rebuilding of the wharves and the dredging of the basin at the general light-house depot, and it is recommended that an appropriation of this amount be made therefor.

The following tabular statements show in a condensed form the shipments and receipts at the depot during the year and the articles manutured:

OIL.

	Lard.	Mineral.	Total.
	Gallons.	*Gallons.*	*Gallons.*
Received	4,000	319,223	323,223
Shipped	2,349	357,798	360,147
Total	6,349	677,021	683,370

GENERAL SUPPLIES.

	Boxes.	Barrels and kegs.	Packages, coils, etc.	Cans.	Total.
Received	11,772	7,549	5,027	49,450	73,748
Shipped	9,269	6,980	8,622	64,338	89,209
Total	20,991	14,529	13,649	113,788	162,957

ILLUMINATING APPARATUS.

	First order.	Second order.	Third order.	Three and one-half order.	Fourth order.	Fifth order.	Sixth order.	Range-light lenses.	Lens and assorted lanterns.	Optical parts of lenses.	Total.
Received	......	......	2	......	5	1	......	......	191	35	234
Shipped	......	......	5	......	5	2	......	......	195	27	234
Total	......	......	7	......	10	3	......	......	386	62	468
Received	......	......	38	......	5	1	......	......	82	7	83
Shipped	......	......	83	......	15	2	......	......	78	1	179
Total	......	......	121	......	20	3	......	......	110	8	262

BOUYS AND BUOY APPENDAGES.

Articles.	Received.	Shipped.	Total.
Whistling buoys	12	13	25
Bell buoys	25	19	44
Can buoys	6	48	54
Nun buoys	9	36	54
Ice buoys	5	4	9
Spar (wood) buoys	....	24	24
Ballast balls	103	101	204
Sinkers (stone and iron)	196	154	350
Shackles and swivels	2,978	1,976	4,954
Chain (buoy), fathoms	165	2,331	2,496
Chain (light-vessel), fathoms	285	165	450
Mushroom anchors	9	6	15

Third District.

MISCELLANEOUS ARTICLES.

	Boxes.	Barrels.	Bales, bundles, coils, packages.	Kegs.	Cans.	Total.
Received	914	387	6,214	18	11	7,544
Shipped	288	180	3,292	28	44	3,832
Total	1,202	567	9,506	46	55	11,376

ARTICLES MANUFACTURED AND REPAIRED.

	Lenses.	Lamps.	Lamp burners.	Cans.	Miscellaneous articles.	Total.
Manufactured	98	156	352	5,610	1,550	7,766
Repaired	6	27	110	1,869	1,280	3,292
Total	104	183	462	7,479	2,830	11,058

New London, Connecticut.—The tender *Cactus* has her headquarters at this depot, as she attends to the lights and buoys in the eastern section of the district. During the past year the wharf was repaired with new piles and fenders and a facing of yellow pine-plank. The coal shed and small storehouse received some repair.

There is kept at this depot a stock of chain cables, anchors, buoys and appendages, and fuel and lime for use and distribution by the *Cactus*, and, when necessary, material for construction and repair. Light-vessels Nos. 19 and 20 are kept here, the former awaiting disposition as a condemned ship, the latter for relief duty when required. A keeper is employed to look after the property.

Goat Island, Newport Harbor, Rhode Island.—Buoys and appendages, light-vessel chain and anchors to meet emergencies, and other materials and supplies are kept at this depot. There is stored here, also, a supply of coal for the stations in Narragansett Bay and for tenders working in that part of the district. The coal bin was repaired.

Juniper Island, Lake Champlain, Vermont.—This depot is used for the storage of buoys and appendages, boats, and material and supplies for the general service on Lake Champlain. The keepers of the light-station on the island have charge of this depot.

TENDERS.

The Armeria.—This steel screw steamer made three trips during the year to deliver annual supplies to the stations from St. Croix River, Maine, to Point Isabel, Texas. The first voyage was from St. Croix River, Maine, to North Brother Island, New York, and extended from August 1, 1895, to October 2, 1895; the second voyage from Cape Lookout, North Carolina, to Point Isabel, Texas, December 16, 1895, to March 28, 1896, and the third voyage from Cape Henry, Virginia, to

Robbins Reef, New York, from May 7 to June 25, 1896. The *Armeria* steamed about 17,200 nautical miles, and consumed some 1,307 tons of coal. She delivered 245,500 gallons of mineral oil, 220 tons of paints, oils, turpentine, etc., 4,100 boxes of chimneys and cleaning materials, and 21,010 miscellaneous stores. She also delivered 310 tons of goods to the light-house depots of the First, Second, Fifth, Sixth, and Eighth districts, and performed special service in placing buoys and in delivering rations and fuel. Heavy seas were encountered at the more exposed stations, rendering it extremely hazardous to cross the shoal-water bars in deep-laden boats. During the year the vessel was hauled out, cleaned, and painted, and her machinery received various small repairs. Members of the Light-House Board took passage on the *Armeria* to inspect light-stations and depots and to visit proposed sites, as did inspectors and engineers of districts through which she passed for the transaction of business in localities not easily or seasonably accessible by other means of transportation. The vessel is kept neat and clean, her discipline is good, and her work well done.

The John Rodgers.—This iron side-wheel steamer was in the dry dock and undergoing repair from July 24 to August 6, 1895. She was laid up again for the same purpose from April 27 to June 22, 1896. She received a boat, an awning, and an electric plant for lighting the vessel. She replaced 175 buoys, cleaned and painted 152 buoys, and delivered 880 packages of supplies, 392 tons of coal, and 4 cords of wood. She recovered from the beach 1 whistling buoy, and picked up from sea 2 first-class iron buoys, and many spar buoys which were adrift from their stations. She lighted 1 wreck and marked the position of 2 other wrecks. She established two new buoys. In serving the system of electric buoys in New York Lower Bay she changed 8 buoys, replaced 2, and worked on the electric cables for 29 days. From October 25 to November 1, 1895, she was engaged placing buoys for the speed trial of the United States ram *Katahdin*. The time not consumed in such duties was devoted to cleaning and painting ship, in handling buoys on the wharf, and in stowing chain, iron and stone sinkers, and mushroom anchors and bells at the general light-house depot. In doing her work she steamed about 9,056 miles, and consumed some 619 tons of coal. The vessel is kept in a condition of neatness and readiness for service.

The Gardenia.—This wooden screw steamer was constantly employed except for 23 days, when she was under repair to her hull and machinery. She placed or replaced 215 buoys, and cleaned and painted 185 others. She repaired the lamps and cables of the electric buoys twenty-five times. She delivered at light-stations 675 tons of coal and 12 cords of wood. She made 30 shipments of freight to the various lines of transportation having depots in New York Harbor. She was engaged 15 days on gas buoys and tanks and filling the gas tank at the Romer beacon. She spent 7 days towing and changing light-vessels, 4 days in transferring light-house keepers, 8 days delivering supplies and buoys to the light-house depot at New London, Conn., and 30 days at the general light house depot filling coal and stowing buoys and chain. She is always neat and ready for work. She steamed about 9,300 miles, and consumed some 494 tons of coal.

The Cactus.—This wooden side-wheel steamer is stationed principally in the eastern section of the district. She made 97 light-house inspections, delivered 685 tons of coal, 57 cords of wood, and 4,345 packages of supplies, and changed or replaced 245 buoys, recovered 10, and painted 264 others. She was engaged 17 days in marking the trial course for the United States ships *Ericsson* and *Katahdin*, 5 days moving keepers, and 7 days changing light-ships. She was under repair 31 days, and she did duty at the depot 23 days. She steamed about 9,065 miles, and consumed some 512 tons of coal.

The Daisy.—This little wooden screw steamer, purchased for the purpose in April, 1895, is especially devoted to the service of the electric buoys in New York Lower Bay, but when not so employed she aids in placing buoys, shipping freight, and delivering supplies. She is a very handy boat, does her duty well, and is kept constantly in a serviceable condition. She was laid up for 68 days, when her boiler and engine received extensive repairs. She delivered 60 packages of supplies and made 8 shipments of freight to transportation lines. She painted 24 buoys and 2 beacons. She kept lamps burning on wrecks of the steamer *Ailsa* and the coal barge *Andrew Jackson*. She was 20 days engaged in inspecting lights, principally those on the Hudson River and on Lake Champlain, whither she went three times during the year. She delivered coal to and set a smokestack at the electric-buoy station. She transported workmen to vessels under repair, placed buoys to mark two wrecks, and as her principal service she attended the electric buoys, making six splices in the cable and replacing 19 lamps, besides some 38 days' work at the station itself. For 25 days she helped in the work of the yard, and attended the regular fire drills. She steamed about 4,320 miles, and consumed some 76 tons of coal.

The Mistletoe.—This side-wheel steamer, except for a month while under repair, was continuously employed on the works of construction and repair. During the year she ran about 7,377 miles with a consumption of some 489 tons of coal.

For several years past in the reports of the Light-House Board it has been recommended to build a new tender to replace the *Mistletoe*, but no money has thus far been appropriated for this purpose, and she is now in such a condition that it is not possible to keep her in running order during the period that must elapse before a new boat can be built, even if Congress should make the necessary appropriation at its next session, without a large outlay for repairs.

Third District.

The following statement was made in the Board's last two annual reports:

> *Tender for engineer of the Third light-house district.*—The engineer's tender, the *Mistletoe*, is the oldest tender is this district, and one of the oldest in the service. She was built in 1871-72. She has done good service, but to put her in effective condition would require new boilers, engine, shafting, wheels, and such other radical changes that it would be more economical to build a new boat of a stronger and more modern type.
>
> With the hard and continuous service to which she is generally put to keep such a large district as this in proper repair, her boiler and machinery continue to deteriorate, and after nearly every long trip she has to be laid up for several days for imperative repairs. This is a loss not only of money but of valuable time, and might be the cause of a very serious accident, in case some important aid to navigation should be disabled, on account of having no boat available to promptly put it in repair.

It is estimated that a suitable steamer can be built, fitted out, and made ready for service for $85,000, and it is recommended that an appropriation of this amount be made therefor.

The Rose.—This little screw steamer was fitted with a new boiler and engine by contract, and was again placed in commission June 17, 1896. Since then she has run some 296 miles with a consumption of about 11 tons of coal.

Steam launch Nettle.—This vessel was laid up 10 days for repair. She was employed on works of repair and construction on Lake Champlain and Long Island Sound, and in the transportation of workmen, material, and light freight about New York Harbor and vicinity. She is specially useful in connection with the construction and repair of stations in Lake Champlain which the larger tenders can not reach. During the year she has steamed some 3,737 miles with a consumption of about 68 tons of coal.

Float for gas tanks.—This vessel is kept for conveying gas tanks to and from the Romer beacon in New York Lower Bay. She is old and worm-eaten, but has lately received such repair as will make her last another year.

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FOURTH DISTRICT.

s district extends from a point on the coast of New Jersey oppo-
hrewsbury Rocks (but does not include the rocks) to and including
nkin Inlet, Virginia. It embraces all aids to navigation on the
ast of New Jersey, Delaware, Maryland, and Virginia, and the
waters tributary to the sea between the rocks and the inlet.

pector.—Commander George C. Reiter, United States Navy, to
30, 1896; since then Commander C. J. Train, United States Navy.

gineer.—Maj. Charles W. Raymond, Corps of Engineers, United
s Army, to September 30, 1895; since then Maj. William H. Bixby,
s of Engineers, United States Army.

this district there are—

houses and beacon lights, including 7 post lights	63
vessels in position	4
unlighted beacons	5
gnals operated by steam or hot-air engines	6
ignals operated by clockwork	7
d buoys in position (gas)	4
ling buoys in position	4
uoys in position	5
oys for winter use	52
buoys in position	187
er *Zizania*, buoy tender, and for supply and inspection	1
a launch *Leal*, used for works of construction and repair	1

LIGHT-HOUSES.

2. *Squan Inlet, seacoast of New Jersey.*—Title to the site was finally
ned, designs and specifications for the necessary buildings were
ared, contracts were made, and erection was begun.

5. *Absecon, Atlantic City, seacoast of New Jersey.*—A survey and
rt was made as to the lands covered by easement deeds to the
ed States. The grounds, heretofore having a surface of loose,
ing sand, were covered with a thick layer of good soil.

0. *Cape May, seacoast of New Jersey.*—The barn was enlarged and
ilt, and various repairs were made. This is a first-order seacoast
t, and three keepers are employed to attend it. There are quarters
only two families, and the third keeper has to be accommodated
makeshift arrangements which are thoroughly unsatisfactory,
detrimental to the discipline and efficiency of the service. It is

estimated that an additional keeper's dwelling can be built here at a cost not exceeding $4,000, and it is recommended that an appropriation of that amount be made therefor.

415. Delaware Breakwater west end beacon, Delaware Bay, Delaware.—The light of this beacon was first exhibited July 20, 1895.

416. Mispillion Creek, Delaware Bay, Delaware.—An extra water tank was furnished, the river banks were strengthened and repaired, and various repairs were made.

419. Murderkill Creek front beacon, Delaware Bay, Delaware.—The light of this beacon was first exhibited September 9, 1895.

420. Murderkill Creek rear beacon, Delaware Bay, Delaware.—The light of this beacon was first exhibited September 9, 1895.

421. St. Jones Creek front beacon, Delaware Bay, Delaware.—The light of this beacon was first exhibited September 9, 1895.

422. St. Jones Creek rear beacon, Delaware Bay, Delaware.—The light of this beacon was first exhibited September 9, 1895.

423. Maurice River, Delaware Bay, New Jersey.—A boat slip was excavated extending from the station to the bay.

By the act approved June 11, 1896, an appropriation of $4,500 was made for establishing range lights and a keeper's dwelling near the entrance of Maurice River, Delaware Bay, New Jersey. The proper measures for beginning this work will be taken at an early day.

427. Mahon River, Delaware Bay, Delaware.—By the act approved June 11, 1896, the sum of $8,500 was appropriated for establishing this station on a new site. The proper measures for beginning this work will be taken at an early day.

432. Port Penn Range (front), Delaware River, Delaware.—About 300 running feet of the river bank was repaired and strengthened and various repairs were made.

435. Reedy Island (rear) (Port Penn Wharf), Delaware River, Delaware.—The erection of the tower and dwelling was completed in February, 1896, and the light was first exhibited March 14, 1896. A detached brick oil house was erected in June, 1896.

436. Salem Creek, Delaware River, New Jersey.—The contractor for the erection of this structure delayed his work so long that the ice finally interfered with its completion by carrying away the unbraced piles and iron columns. The latter, however, were recovered, and will be used in the erection of the structure during the summer or fall of 1896.

442. Deep Water Point Range (front), Delaware River, New Jersey.—The old riprap protection of the south bank was replaced by a dry rubble sea wall. About 600 feet of the boundary fence was rebuilt. The small boathouse and its ways were repaired.

443. Deep Water Point Range (rear), Delaware River, New Jersey.—The entrance road was surfaced with oyster shells, the barn was raised, and its approaches were put in order.

Fourth District.

451. Billingsport (front), Delaware River, New Jersey.—A detached brick oil house was erected.

452. Tinicum Island (rear), Delaware River, New Jersey.—A detached brick oil house was erected, about 600 feet of new wire fence was built, and a cesspool and drains were constructed.

453. Fort Mifflin Bar Cut (rear), Delaware River, New Jersey.—A detached brick oil house and about 1,200 feet of wire fence were built.

473. Assateague, seacoast of Virginia.—A survey of the station was made, the wharf and boathouse were rebuilt, and about 4,800 feet of fence was put up.

REPAIRS.

At each of the following-named stations repairs of greater or less extent were made during the year:

403. Barnegat, N. J.
404. Tucker Beach, N. J.
406. Ludlam Beach, N. J.
407. Hereford Inlet, N. J.
410. Cape May, N. J.
411. Cape Henlopen, Del.
412. Delaware Breakwater (east end), Del.
413. Delaware Breakwater (front), Del.
414. Delaware Breakwater (rear), Del.
415. Delaware Breakwater (west end), Del.
416. Mispillion Creek, Del.
417. Brandywine Shoal, Del.
418. Fourteen-Foot Bank, Del.
423. Maurice River, N. J.
424. Egg Island, N. J.
425. Cross Ledge, N. J.
427. Mahon River, Del.
429. Cohansey, N. J.
430. Bombay Hook, Del.
432. Port Penn (front), Del.
433. Port Penn (rear), Del.
434. Reedy Island (front), Del.
435. Reedy Island (rear), Del.
437. Finns Point (front), N. J.
438. Finns Point (rear), N. J.
440. Newcastle (front), Del.
441. Newcastle (rear), Del.
442. Deep Water Point (front), N. J.
443. Deep Water Point (rear), N. J.
445. Christiana, Del.
446. Cherry Island (front), Del.
447. Cherry Island (rear), Del.
449. Schooner Ledge (front), Pa.
450. Schooner Ledge (rear), Pa.
451. Billingsport (front), N. J.
452. Tinicum Island (rear), N. J.
453. Fort Mifflin Bar Cut (rear), N. J.
455, 456, 457. Horseshoe, West Group, Pa.
458, 459, 460. Horseshoe, East Group, N. J.
461, 462. Schuylkill River, Pa.
471. Fenwick Island, Del.
473. Assateague, Va.
474. Killick Shoal, Va.

FOG BELLS.

At all the fog-bell stations of the district, viz, Fort Mifflin, Pa.; Edgemoor and Reedy Island, Delaware; Ship John Shoal, Cross Ledge Shoal, Brandywine Shoal, Delaware Bay, and Killick Shoal, Virginia, the fog-bell machinery was overhauled and put in as good repair as practicable with the present apparatus, which is now from 12 to 20 years old.

LIGHT-VESSELS.

408. Northeast End light-vessel, No. 44, off the seacoast of New Jersey.—On July 29, 1895, this vessel was removed from her station and a whistling buoy was substituted. The vessel was docked, and her bottom cleaned and painted, the starboard side with two coats of germicide paint and the port side with one coat of Williams's submarine compound anticorrosive and one coat of antifouling. Repairs were made to the boilers. The vessel was replaced on her station August 15, 1896. Rations, coal, wood, rope, paint, waste, stovepipe, canvas, and rubber and plates for surge reliever were supplied.

409. Five-Fathom Bank light-vessel, No. 40, off the seacoast of New Jersey.—The boilers of the fog signal being in need of new tubes, smokestack, and other repairs, tubes were purchased and a smokestack was made. Mechanics were sent to the station and the necessary repairs were made. One boat was repaired. Rations, coal, wood, drills, rope, stovepipe, new galley stove, paint, etc., were supplied.

470. Fenwick Island Shoal light-vessel, No. 52, off the seacoast of Maryland.—This vessel was removed from her station August 5, 1895, and taken on the dock August 7, when her bottom was cleaned and painted. Various repairs were made. She resumed her station August 15, 1895. Some 90 tons of coal, 2 cords of wood, rations, copper nails, lumber, etc., were supplied.

472. Winter Quarter Shoal light vessel, No. 45, off the seacoast of Virginia.—The work of putting in two Hornsby-Akroyd 3½-horsepower oil engines, one horizontal and one vertical, with an air compressor, tanks, Crosby chime whistle, etc., was completed and the vessel resumed her station October 18, 1895, relieving relief light-vessel No. 9. Rations, coal, wood, lumber, stovepipe, etc., were supplied. The water tanks were cemented on the inside and repairs were made to the galley pump. Various minor repairs were made.

—. *Relief light-vessel No. 9.*—Two tons of coal were supplied. On October 18, 1895, this vessel was relieved by light-vessel No. 45, when she was towed by the tender *Zizania* to Tompkinsville, N. Y., and delivered to the inspector of the Third light-house district.

—. *Relief light-vessel for the Fourth and Fifth light-house districts.*—The following recommendation was made in the Board's last two annual reports:

> During the recent cyclones light-ship No. 37, stationed off Five-Fathom Bank, coast of New Jersey, Atlantic Ocean, in the Fourth light-house district, was wrecked. There is now no relief light-ship in the Fourth light-house district. The interests of commerce and navigation urgently require that a new vessel should be provided to replace the wrecked vessel at the earliest day practicable. When that is done the vessel now on Five-Fathom Bank can be used as a relief light-vessel, and can be held in reserve to take the place of any one of the light-vessels now on stations in the Fourth light-house district whenever any of them may become disabled.
>
> It is estimated that the construction and establishment of a first-class light-vessel, with a steam fog-signal, suitable for Five-Fathom Bank, will cost $80,000, and it is recommended that an appropriation of that amount be made therefor.

Fourth District.

Light-vessel for Overfalls, or South Shoal, entrance to Delaware Bay.—The following recommendation was made in the Board's last two annual reports:

> Petitions have been made during the past year to this office by the American Association of Masters and Pilots from Camden, N. J., and from officers of the steam colliers and sea tugs of the Philadelphia and Reading Transportation Line for the establishment of a light-vessel at the Overfalls, or South Shoal, entrance to Delaware Bay. While the entrance to Delaware Bay is well lighted and can be entered with safety in clear weather, the entrance is difficult and dangerous in thick and stormy weather. Neither the whistling buoy on the South Shoal nor the Daboll trumpet on Delaware Breakwater can be heard always at a safe distance. Mariners have been within half a mile of Delaware Breakwater with the Daboll trumpet in operation without being able to hear it. The entrance to Delaware Bay is shoal on the northern side from Cape May to the Overfalls buoy, and "steep-to" at Cape Henlopen. This makes it the more necessary that this shoal be well marked by a light-vessel having a more powerful fog-signal.
>
> It is estimated that such a light-vessel could be established here for not to exceed $[illegible]0,000. Recommendation is therefore made that an appropriation of this amount be made for that purpose.
>
> It is claimed that if the light-vessel is established the following changes, all in the interest of economy, can be made:
>
> The Delaware Breakwater front and rear lights can be discontinued.
>
> The Cape May light can be changed from the first to the third order.
>
> Two post lights can be established in place of the Delaware Breakwater front light, a red one to be exhibited from the present building and a white one on the extreme western end of the ice breaker. These two lights can be attended by one keeper, to occupy the present dwelling.

Reimbursement of seamen's losses.—The following recommendation, made in the Board's last annual two reports, is renewed:

> The honorable the Secretary of the Treasury, at the instance of the Board, wrote to the Speaker of the House of Representatives on September 28, 1894, asking that proper measures might be taken to reimburse the legal representatives of Howard Glover, mate of light-ship No. 37, and of George Richardson, a seaman on the same vessel, for the value of the clothing lost when they were drowned on the occasion of the foundering of that vessel. The amounts named in the sworn statements, which were transmitted and recommended by the inspector of the Fourth light-house district, were $77.25 in the first case and $50 in the other.

DAY OR UNLIGHTED BEACONS.

Cape Henlopen day beacon.—Wooden skeleton of pyramidal form, 49 feet high, painted black, with white band, located two-thirds of a mile from Cape Henlopen light-house, and is in good condition.

Broadkill day beacon.—This beacon consists of a post crossed with a board 5 feet long, painted white, showing the name "Broadkill" in large black letters, and is in good condition.

Delaware Breakwater day marks, Delaware.—These day marks, one placed on the Delaware Breakwater and one on the ice breaker, set pointing toward each other, are hand-shaped, painted white, with words

"Danger through gapway" on each in black letters. These marks are in good condition.

Rum Point day beacon, Absecon Inlet.—This beacon is located on Rum Point, Absecon Harbor, and consists of a post crossed with five boards 5 feet long, placed at right angles, and is in good condition. It was rebuilt in June, 1896.

FOG SIGNALS OPERATED BY STEAM OR HOT-AIR ENGINES.

408. Northeast End light-vessel, No. 44, New Jersey.—The 12-inch steam whistle was in operation some 426 hours, and consumed about 19 tons of coal.

409. Five-Fathom Bank light-vessel, No. 40, New Jersey.—The 12-inch steam whistle was in operation some 282 hours, and consumed about 17 tons of coal.

412. Delaware Breakwater, east end, Delaware.—The second-class Daboll trumpet was in operation some 400 hours, and consumed about 2½ tons of coal.

418. Fourteen-Foot Bank, Delaware Bay, Delaware.—The second-class Daboll trumpet was in operation some 293 hours, and consumed about 2 tons of coal.

470. Fenwick Island Shoal light-vessel, No. 52, Maryland.—The 12-inch steam whistle was in operation some 335 hours, and consumed about 42 tons of coal.

472. Winter Quarter Shoal light-vessel, No. 45, Virginia.—The Hornsby-Akroyd oil engine with the 8-inch Crosby chime whistle was in operation some 221 hours, and consumed about 205 gallons of mineral oil.

BUOYAGE.

There were maintained last year on the seacoast from Squan Inlet, New Jersey, to Chincoteague Inlet, Virginia, 27 buoys; in Barnegat Inlet, New Jersey, 9 buoys; in Tucker Cove and Little Egg Harbor inlets, New Jersey 12 buoys; in Absecon Inlet, New Jersey, 5 buoys; in Great Egg Harbor Inlet and River, New Jersey, 13 buoys; in Townsend Inlet, New Jersey, 3 buoys; in Hereford Inlet, New Jersey, 5 buoys; in Delaware Bay and River and Schuylkill River, 118 buoys; in Chincoteague Inlet, Virginia, 5 buoys; and in Metomkin Inlet, Virginia, 3 buoys; in all, 200 buoys.

Goose Island Flat, No. 20, Delaware River.—This first-class nun buoy was on July 1, 1895, changed to a gas-lighted buoy.

Seventeen-Foot Knoll, No. 34, Delaware River.—This spar buoy was on July 15, 1895, changed to a gas lighted buoy.

426. Elbow of Ledge, No. 14.—This gas buoy was kept in position during the year, except from January 5 to February 13, 1896, and from February 20 to March 19, 1896.

Fourth District.

431. Baker Shoal, No. 20.—This gas buoy was kept in position during the year, except from January 5 to February 12, 1896, and from February 20 to March 19, 1896.

439. Goose Island Flat, No. 26.—This gas buoy was kept in position during the year, except from January 4 to February 13, 1896, and from February 20 to March 18, 1896.

448. Seventeen-Foot Knoll, No. 34.—This gas buoy was in position from July 15, 1895, to January 4, 1896; from February 13 to 20, 1896, and from March 18 to June 30, 1896.

These gas buoys were removed when endangered by ice.

About 17,640 cubic feet of gas was supplied for gas buoys during the year, at a cost of $88.20 for gas and $132 for transportation of the buoys from the tender to the gas works and return.

BUOYS PLACED DURING THE YEAR.

A first-class can buoy, with black and white perpendicular stripes, was placed to mark the entrance to the dredged channels leading into Murderkill and St. Jones creeks.

A second-class can, red and black horizontal stripes, was placed to mark the wreck in the dredged channel, Bulkhead Shoal, Delaware River.

A second-class can, red and black horizontal stripes, was placed to mark a sunken canal boat about 900 feet south of the Delaware and Raritan Canal Dock at Bordentown, N. J.

A red spar buoy was placed to mark a sunken scow on the eastern side of the channel, between Eagle Point buoy, red, No. 46, and Horseshoe buoy, black, No. 37, Delaware River.

A third-class nun buoy with red and black horizontal stripes was placed to mark the wreck of the schooner *Jewess*, about 500 yards from shore, off the South Brigantine life-saving station.

A black second-class can buoy, with letter "W." in white on two sides, was placed to mark the wreck of the schooner *Lottie K. Friend*, on the western side of the main ship channel, nearly abreast Ship John Shoal light-house, Delaware Bay.

A black first-class can buoy, with the letters, "B. F. B." in white, was placed to mark a 13-foot spot on the south end of Black Fish Bank, off Assateague light-house, Virginia.

CHANGE IN POSITION OF BUOY.

The South Shoal whistling buoy was moved about a quarter of a mile SW. by W. ½ W. from its former position, and moored in 48 feet of water, near the easterly edge of the white sector of Brandywine Shoal light. Vessels entering Delaware Bay, bound up, may now change course directly after having passed the buoy, as Brandywine Shoal light will then show white.

Fourth District.

DEPOTS.

Edgemoor light-house depot, Delaware River, Delaware.—About 14,000 cubic yards of mud was removed from the harbor, and the work upon the repair of the deck of the north wharf and the deck and front wall of the storage platform and bulkhead was partially completed.

Repairs are now in progress sufficient to put the deck and wharves of this depot into tolerable shape.

The following recommendation was made in the Board's annual report for 1895:

> The wharf of this depot is in a bad condition, and if its deterioration is allowed to continue unchecked the usefulness of the depot will soon be destroyed. Repairs are being made sufficient to enable the Board to carry on the work of the depot during the ensuing year, but in addition the following-named work should be done at an early day, to enable the depot to fully serve its purpose: The whole basin should be dredged to a depth of 9 feet. At present about half the basin is bare at low water. All three of the inner cribs of the south wharf and the portions of the pier joining them ought to be rebuilt. The bulkhead wall should be entirely rebuilt. New decking and new sheet piling are needed in all parts of the piers, and new foundations are needed under the north wall of the storehouse.
>
> The estimated cost of this work is—

North wharf	$6,930
South wharf	8,635
Bulkhead, etc	12,815
Dredging basin	2,420
Total	30,800

It is estimated that $10,000 can be profitably expended during the coming year on this work, and it is recommended that an appropriation of this amount be made therefor.

Chincoteague Inlet, Virginia.—The spar buoys for Chincoteague and Metomkin inlets are stored here. It is also used as a depot for Assateague and Killick Shoal light-houses, and for the care of boats from Winter Quarter Shoal light-vessel. The depot occupies half of a small wharf, and the frontage of the wharf is inadequate to properly accommodate the tender while lying there. The buoy-house is not adapted to the care of the light-vessel's boats. A reasonable offer for additional wharf frontage was obtained from the owner of adjacent property, and he was requested to prepare the necessary transfer papers.

Absecon, near Atlantic City, New Jersey.—A survey was made and a wharf 20 by 96 feet in plan was built.

Cape May boathouse, New Jersey.—A boathouse 19 by 36 feet in plan was built on a pile foundation, thus giving sufficient room to store two 26-foot boats.

TENDERS.

The Zizania.—This steel twin-screw steamer was employed throughout the year, except during 32 days when she was laid up for repairs, in attending to the buoyage of the district, towing light-vessels to and from their stations, and relief light-vessel No. 9 from Winter Quarter Shoal station to Tompkinsville, N. Y., and in delivering fuel and supplies to light-houses, light-vessels, and post lights. She replaced and restored 8 buoys, changed 274, placed 11, removed 10, lifted and painted 17, renewed 34, and recovered 7 buoys. She landed 109 tons of coal and 10¼ cords of wood at light-houses and 219 tons of coal and 4¾ cords of wood at light-vessels. The crew was employed 46 days at Edgemoor light-house depot and the iron pier at Lewes, Del. She delivered the annual allowance of provisions to 4 light-vessels and 11 light-stations. She also conveyed the inspector to the light-stations of the district for the purpose of inspection, and she delivered the necessary supplies to the stations. In doing this work she steamed some 14,392 miles, and consumed about 1,022 tons of coal and 5 cords of wood. On August 3, 1895, the *Zizania* in coming up the Delaware Bay collided with the fishing schooner *Addie Ludington.* The schooner was towed by the *Zizania* to a place of safety. Necessary supplies, such as rope, oil for lubricating, waste, soda, paint, packing, baskets for coaling stations, medicine, provisions, etc., were furnished. Various repairs were made. A new hoisting engine and a new steam-steering engine were put in. The upper deck was re-covered with canvas.

Tender for engineer Fourth district.—There is no vessel permanently available for the engineer service of construction and repair in this important district. Temporary arrangement has been made for the present working season by transferring the tug *Thistle* from the Fifth district, but this latter district has a large number of lights on inland waters, and a boat like the *Thistle* is essential for their proper maintenance. A suitable vessel for the permanent service of construction and repair is much needed in the Fourth district, which now has only one permanent tender attached.

FIFTH DISTRICT.

This district extends from, but does not include, Metomkin Inlet, Virginia, to and including New River Inlet, North Carolina. It embraces all aids to navigation on the seacoast of Virginia and North Carolina between the limits named, all of Chesapeake Bay, and the sounds of North Carolina and tributary waters.

Inspector.—Commander Benjamin P. Lamberton, United States Navy.

Engineer.—Capt. Eric Bergland, Corps of Engineers, United States Army, until November 6, 1895; since then Maj. Ernest H. Ruffner, Corps of Engineers, United States Army.

In this district are—

Light-houses and beacon lights, including 2 post lights	120
Light-vessels in position, including tender *Holly*	3
Day or unlighted beacons	11
Fog signals operated by steam or hot-air engines	3
Fog signal operated by petroleum engine	1
Fog signals operated by clockwork	64
Whistling buoy in position	1
Bell buoys in position	2
Lighted buoy in position	1
Other buoys in position, including pile buoys and stakes	1,127
Steamers *Maple* and *Violet*, buoy tenders, and for supply and inspection	2
Steam launch *Bramble*, used to supply gas to the beacons in the sounds of North Carolina	1
Sharpie (and gas tank) for supplying beacons and coast stations	1
Steamers *Jessamine* and *Thistle*, for construction and repairs	2

LIGHT-HOUSES.

475. Hog Island, Great Machipongo Inlet, seacoast of Virginia.—At the date of the last annual report the erection of the iron tower had been begun. It was completed on September 30, 1895. Work on the structures at the station was kept up until the middle of November, when the keepers were transferred from their former quarters to the new ones, and on January 31, 1896, the light was shown. The lens, which had been in use at the Cape Charles light-station before the removal of the latter to a new site, was, by slight alterations, made to serve the purpose at Hog Island, and it was put in place with little difficulty. The new light shows a white flash of 3 seconds' duration at intervals of 45 seconds.

5

Fifth District.

477. Cape Charles, on Smith Island, entrance to Chesapeake Bay, seacoast of Virginia.—The illuminating apparatus was removed from the old tower in October. The flashes in the new light were produced in such quick succession as to cause indistinctness when viewed at some distance, and it was found desirable to double the intervals. This was effected by changing the governor and weights of the clockwork so as to make the lens revolve more slowly. The efficiency of the new structure as a day mark will soon be increased by painting the lantern black.

480. Old Point Comfort, entrance to Hampton Roads, Virginia.—In June the old wooden fog-bell tower was removed and a substantial iron structure was substituted. An iron oil house was erected.

—. *Hog Island Wharf and Dollers Point, James River, Virginia.*—The following recommendations were made in the Board's annual report for four years:

> Lights have been maintained at these points for several years by private enterprise, and their value to the public interests of navigation is now evident. It is therefore recommended that proper measures be taken for establishing range lights at Dollers Point to guide vessels through the narrow and shallow channels, known as Goose Hill Slough, between Hog Island and Jamestown Island; also for the establishment of an inexpensive light on the wharf at Hog Island, to lead the way through another difficult channel from Deep Water Shoals light to the north point of Hog Island, where an abrupt turn is made to enter Goose Hill Slough.

It is estimated that these lights can be established for $2,500, and it is recommended that this amount be appropriated therefor.

493. York Spit, entrance to York Spit, Virginia.—In October the lens was sent to the general light-house depot for repair. It was replaced by a lens lantern until its return in January. Various repairs were made.

496, 497. Cape Charles City Range, Virginia.—A new boat davit was put up. About 150 bushels of shells were deposited around the rear beacon in April to keep the sand in place and prevent undermining of the structure.

507. New Point Comfort, entrance to Mobjack Bay, Virginia.—In August the station was thoroughly repaired.

508. Wolf Trap, on a shoal between York and Rappahannock rivers, Virginia.—Two new brackets for oil tanks were put up in August. In September and October the superstructure was thoroughly painted.

510. Bowlers Rock, Rappahannock River, Virginia.—During July, 1895, 270 cubic yards of riprap stone were disposed in masses on each side of the station in the axis of the current to afford protection against moving ice.

—. *Beacon lights on Rappahannock River, Virginia.*—The following statement, in effect, was made in the Board's last three annual reports:

> The trade on this river is growing rapidly. At certain seasons of the year ten or more large steamers make weekly trips here, carrying vegetables, fruits, and the like. As the river is inadequately lighted, these steamers with their perishable freight

often have to tie up at night for the lack of guiding lights. The Board recommends the establishment of a red light to be at the entrance to Carters Creek, at a cost not exceeding $3,000, and of three beacon lights, one on or near Sharp's wharf, below Suggett Point, one on Tappahannock wharf, and one on Taylor's wharf, at an estimated cost of $100 each. Recommendation is made that $3,300 be appropriated for this purpose.

519. *Smith Point, mouth of Potomac River, Virginia.*—The plans and specifications of the metal work were completed in December, and in due time contract was made therefor. The metal work was delivered at the Lazaretto light-house depot in May. Meanwhile the plans and specifications were being made for the erection of the structure at the site. Bids therefor were received, and were rejected because the lowest bidder proved to be a defaulting contractor on other light-house work. New proposals will be opened on July 30, 1896.

By the sundry civil appropriation act approved June 11, 1896, $41,000 was appropriated for finishing the reestablishment of this light-house.

520. *Point Lookout, entrance to Potomac River, Maryland.*—The oil house erected during June was thoroughly painted. On November 30 the red sector in the light was discontinued.

—. *Ragged Point, Potomac River, Virginia.*—This shoal makes off from the west bank of the river at a short turning point. It is important that this point be marked by a light at night and a fog signal during thick weather. It is estimated that a light and fog-signal station can be established here for $20,000, and it is recommended that an appropriation of this amount be made therefor.

524. *Lower Cedar Point, Potomac River, Maryland.*—Plans and specifications for the metal work were printed, and the work was contracted for on March 18. The erection of the superstructure will be done by hired labor. Most of the materials required were purchased under contract, and the framing of the dwelling, preparatory to erection at the site, was carried on at the Lazaretto light-house depot. It was completed, and with the requisite force of workmen, the working plant, etc., is about to be transported to its destination.

527. *Maryland Point, Potomac River, Maryland.*—About 2,100 tons of heavy riprap stone were placed in two piles, one about 100 feet above and the other a like distance below the light-house, to serve as ice breakers. The previous winter showed the need of protecting this pile structure in this way from the action of the ice fields.

528. *Fort Washington, Potomac River, Maryland.*—About 125 feet of plank walk was laid. A brick cistern was built to provide the keeper with drinking water. Some 30 running feet of picket fence was built in the rear of the dwelling and whitewashed. Various repairs were made.

531. *Solomons Lump, Kedge Straits, Chesapeake Bay, Maryland.*—The foundation cylinder had been completed, and on June 30, 1895, the

erection of the superstructure was begun, and it was finished on July 26. The new light-house consists of a cast-iron foundation cylinder, 25 feet in diameter, resting on a steel caisson, the whole 37 feet in height and partly filled with concrete, surmounted by a brick and wooden superstructure 25 feet high, upon the tower of which is built the lantern. The focal plane is 46 feet 6 inches above mean high-water line. The light is fixed white of the fifth order, and on September 30 was shown for the first time. The fog bell is struck by machinery every 10 seconds during thick and foggy weather.

535. *Cedar Point, mouth of Patuxent River, Chesapeake Bay, Maryland.*—Contracts were made for furnishing the metal work and for erecting the light-house. The metal work was finished and delivered at the Lazaretto light-house depot. On May 7 the erection was begun. By the end of June the concrete foundations of the dwelling and light-tower were finished and the frame was partly erected. The foundation for the oil house was laid and the rafters were fitted together. The boathouse and fog-bell tower were nearly completed, and the brick foundation of the outhouse was laid and the frame was made ready for erection. The date fixed by the contract for the completion of the work is September , 1896, and the station is to be ready for use by that time.

536. *Drum Point, entrance to Patuxent River, Maryland.*—A new landing ladder was put in place in July.

541. *Thomas Point Shoal, off Thomas Point, Chesapeake Bay, Maryland.*—A new lightning rod was set up. Four new water tanks were supplied to replace the old ones. Minor repairs were made.

545. *Baltimore light and fog-signal station, Patapsco River, Maryland.*—Plans and specifications for this structure have been under consideration, but owing to contemplated improvements in the harbor by which the main channel may be changed, the location of the light has not been finally determined.

561. *Currituck Beach, seacoast of North Carolina.*—Thorough repairs were made. About 280 running feet of new board fence and two gates were built. An iron oil house was erected.

562. *Bodie Island, seacoast of North Carolina.*—An oil house was erected. General repairs were made.

563. *Cape Hatteras, seacoast of North Carolina.*—General repairs were made.

564. *Cape Hatteras beacon, one-quarter of a mile from the extremity of Cape Hatteras Point, North Carolina.*—In November, 1895, this beacon was reported by the keeper as in danger of destruction by the waves. The beach in front of it had been cut away 35 feet in 24 hours, and the high-water line had advanced as far as the piles of the structure. Arrangements were made for the exhibition of a temporary light in case of the loss of the beacon, but there has been so far no need of

such an expedient. The structure is still intact, and the beach has since made out somewhat. Slight repairs were made.

565. Outer Diamond Shoal, off Cape Hatteras, North Carolina.—A modified project for the design and construction of this light-station, prepared by the engineer secretary of the Board, was adopted by the Board at its meeting on October 7, 1895, and the preparation of detailed plans in accordance with this project were at once begun. Plans were also prepared for two steel skeleton structures to be placed on the shoal near the location of the main structure to serve as survey stations and day marks. These plans were approved at the meeting on April 6, 1896, advertisements for the metal work for these structures were issued May 23, and bids were received June 9. By the act approved June 11, 1896, Congress directed that a portion of the appropriation for Diamond Shoal light-station be used for constructing a light-vessel, and that the remainder "should be covered into the Treasury." At this date the plans of the main structure had been practically completed as to structural details and a preliminary model had been made. Upon approval of the act above referred to all work on the plans for the light-house was stopped. Preparation of plans for the light-vessel was begun and these plans are well advanced.

568–578. Gas-lighted beacons in North Landing River, Virginia, and Currituck Sound and North River, North Carolina.—At beacon No. 5, Currituck Sound, 12 wooden piles were driven around the structure as a protection from passing vessels. At beacon No. 8, Long Point, North Carolina, extensive repairs were made. This station is the operating center for the system of gas-lighted beacons. At Coanjock day beacon, North Carolina, in March the old pile beacon showing an oil light was removed and was replaced by a new structure, consisting of a wooden pile incased by an iron sleeve pile and column supporting three gas cylinders, a lantern showing a gas light, and an iron ladder for attendance on the light. Beacon No. 9, North River, North Carolina, which was overturned by a passing vessel in June, 1895, was restored, a lantern was supplied, the proper connections were made, and the gas light was reestablished in September.

581. North River, entrance to Pamlico River, North Carolina.—In March a landing platform was built under the house. Iron boat davits were substituted for wooden ones, and various repairs were made.

—. *Reeds Point, lower side of the mouth of Perquimans River, Albemarle Sound, North Carolina.*—Plans are in preparation for a beacon with a 5-day lantern to be established at this point.

583. Laurel Point, Albemarle Sound, North Carolina.—This structure suffered severely from moving-ice masses during the winter of 1893–94. Measures had been taken in the fall of 1893 to strengthen the light-house by the substitution of new iron columns for the broken ones, but the severe weather of the next winter, which caused an unprecedented formation of ice in this locality, left the structure in a worse plight than before. During an inspection made in October, 1895, it was found that five of the new columns were cracked below the flanges and above the lower main sockets. The house had been pushed over, and it was somewhat out of level. In the construction of this light-house the iron piles and columns upon which the superstructure rests were designed to stand in an inclined position instead of vertically, as in most types of the screw-pile light-house, and consequently any attempt to level the house and straighten the ironwork was likely to result in a collapse of the structure. Hence, clusters of heavy wooden piles were driven in front of and a short distance from each of the iron foundation piles, to act as fenders against ice fields in action. These groups were composed of about fifteen piles each, securely fastened together at the top by iron chains.

—. *Blockade Shoal, off Pork Point, on Roanoke Island, Croatan Sound, North Carolina.*—The Board in its annual reports for seven years recommended the establishment of a light and fog signal on this shoal.

> There are eleven steamers running regularly, together with a large number of sailing vessels passing this point. Much property has been destroyed and many serious accidents have occurred in the vicinity for the want of a light, and the navigation of these waters is dangerous and much dreaded. The obstructions to the westward of the narrow channel, constructed during the war of the rebellion, have never been removed. This is also a turning point for vessels navigating the sound, and steamers after leaving Croatan or Roanoke Marshes lights for this point can make it by steering a single coarse only.

The Board is now of opinion that a light-station without a fog signal can be established here for $5,000, and it is recommended that an appropriation of that amount be made therefor.

588. *Roanoke Marshes, between Pamlico and Croatan sounds, North Carolina.*—There are strong currents to the westward of this light-house, and vessels using the channel on that side frequently pass dangerously near the structure. On seven different occasions it has been struck by craft, but uniformly with much less injury to it than to the colliding vessel. The risk to the light-house, however, is serious, and it has been decided to provide means of defense. Eight groups of seven or eight creosoted piles each will be driven, four on the north and four on the south side, 20 feet apart and 150 feet from the center of the house. These, it is expected, will meet and effectually withstand the blows of unmanageable vessels or tows and give safety to the light-house. A contract has been made for furnishing the piles, and they will be driven as soon as practicable. Various repairs were made.

593. *Northwest Point Royal Shoal, Pamlico Sound, North Carolina.*—Inspection showed that the riprap stone which had been placed under and around the light-house in 1889 has been either partly washed away or embedded in the shoal, leaving the structure in a weak condition. This is one of the oldest screw-pile light-houses in the district. The

shoal upon which it is built has undergone much change since soundings were made in 1868. The six piles have now but 2 feet 6 inches hold in the ground. The superstructure was renewed in 1882. Some of the braces were injured by the ice; the house moves some in storms, and it is not quite safe. As it would cost so much to replace this light-house, it was decided to strengthen the house, so as to prolong its life, if not to rehabilitate it. It is therefore proposed to sink six hollow 13-inch cast-iron piles between the present piles and at a like distance from the center pile. All stone in the way is to be removed. After the piles come to a bearing, they will be filled with concrete. These piles will be surmounted by columns, upon which will rest I-beams connecting them with each other. In addition, two cross beams will be set under the house, securely fastened to two opposite peripheral beams. All will be properly braced, and the superstructure will be blocked up and firmly brought to a bearing. A contract was made in June to do the work. Operations at the site will soon be commenced.

597. *McWilliams Point Shoal, Pamlico River, North Carolina.*—This beacon, which was badly injured by passing vessels, was put in thorough order in June.

—. *Wilkinson Point, Neuse River, North Carolina.* —. *Otter Creek, Neuse River, North Carolina.*—Square, pyramidal, skeleton structures on four piles were erected at Wilkinson Point and opposite Otter Creek, Neuse River, North Carolina, in April, and on May 30 the lights were exhibited. Each stands in 10 feet of water, with a focal plane 11 feet above mean high water, and each shows a fixed white light from a Funck lantern.

REPAIRS.

Repairs more or less extensive were made during the year at the following-named stations:

478. Cape Henry, Va.
479. Thimble Shoal, Va.
482. Craney Island, Va.
488. Deep Water Shoals, Va.
494. Old Plantation Flats, Va.
495. Cherrystone, Va.
502. Pages Rock, Va.
511. Windmill Point, Va.
515. Somers Cove, Md.
521. Piney Point, Md.
522. Blackistone Island, Md.
525. Mathias Point Shoal, Md.
526. Upper Cedar Point, Md.
532. Great Shoals, Md.
533. Sharkfin Shoal, Md.
537. Cove Point, Md.
538. Sharps Island, Md.
540. Bloody Point Bar, Md.
544. Love Point, Md.
548 Seven-Foot Knoll, Md.
553. Leading Point, Md.
554. Lazaretto Point, Md.
555. Pooles Island, Md.
558. Havre de Grace, Md.
586. Roanoke River, N. C.
589. Long Shoal, N. C.
592. Southwest Point Royal Shoal, N. C.
595. Brant Island Shoal, N. C.
596. Pamlico Point, N. C.
600. Neuse River, N. C.

Fifth District.

LIGHT-VESSELS.

476. Cape Charles light-vessel, No. 49, entrance to Chesapeake Bay, Virginia.—This vessel remained on her station during the year. In October, 1895, a new steam receiver for the boilers was made in Norfolk, Va., and was delivered to the vessel on her station by the tender *Maple.* The work of disconnecting and removing the old receiver and placing and connecting the new one was done by the engineer's force on the ship. She was furnished during the year with provisions, fuel, paints, and minor supplies.

481. Bush Bluff light-vessel, entrance to Norfolk, Elizabeth River, Virginia.—On December 9, 1895, the old light-house tender *Holly*, which was on this station, was replaced by the schooner *Drift.* The *Drift* was furnished with rations and minor supplies.

518. Smith Point light-vessel, No. 46, in Chesapeake Bay, off the mouth of the Potomac River, Virginia.—On June 19, 1896, this vessel was brought to Baltimore, Md., for repair, and the station was marked by a gas buoy. She was hauled out and cleaned, some 1,000 pounds of zinc sheathing was renewed, two new masts were placed, the lantern masts were wedged, the forecastle and main decks were repaired, the engines were overhauled and lined up, and a new suit of sails, some tableware, and wire rope for hoisting lanterns were furnished. She is now in excellent condition for service and will be replaced on the station about July 16. Fuel, rations, and fresh water were supplied.

Tender Holly.—This old iron side-wheel steamer, used as a relief light-vessel, was on Bush Bluff station until December 9, 1895, when she was towed to the depot at Portsmouth, Va., and placed in charge of a watchman.

—. *Cape Lookout Shoals light-vessel, North Carolina.*—The following recommendation was made in four preceding annual reports of the Board:

> Cape Lookout Shoals extend 8 miles beyond the point of the cape. There are dangerous breakers on the shoals 5 miles from the cape. When a vessel drawing more than 15 feet of water has made sufficient offing to just clear these shoals, she is 10 miles distant from the Cape Lookout light. Although this light is of the first order, shown from a tower 150 feet high, and should be seen a distance of 18 miles under favorable circumstances, it may happen during thick or hazy weather that a mariner may fail to see it in time to avoid that line of shoals. A light-ship of the improved model now constructed for use at exposed stations, and provided with a steam fog signal, to cost $80,000, approximately, would be a valuable aid to navigation if placed near the southern extremity of the shoals. It is therefore recommended that an appropriation of that amount be made therefor.

FOG SIGNALS OPERATED BY STEAM OR HOT-AIR ENGINES.

476. Cape Charles light-vessel, No. 49, entrance to Chesapeake Bay, Virginia.—This 12-inch steam whistle was in operation some 89 hours during the year, and consumed about 16 tons of coal.

Fifth District.

478. *Cape Henry, entrance to Chesapeake Bay, Virginia.*—This first-class steam siren, in duplicate, was in operation some 230 hours during the year, and consumed about 16 tons of coal.

508. *Wolf Trap, Chesapeake Bay, Virginia.*—This second-class Daboll trumpet, operated by a petroleum engine, was in operation about 213 hours during the year, and consumed 102 gallons of mineral oil.

518. *Smith Point light-vessel, No. 46, off the mouth of the Potomac River, Virginia.*—This 12-inch steam whistle was in operation about 124 hours during the year, and consumed about 10½ tons of coal.

The fog bells in the district are in fair condition.

DAY OR UNLIGHTED BEACONS.

The day beacons in the district are in good condition and have received but slight renewals during the year.

POST AND BEACON LIGHTS.

The two post lights in Elk River, Maryland, were efficiently kept during the year. They are used by the commerce passing through the inside passage to Delaware Bay. On August 26, 1895, four post lights were established in York River below West Point, Va. The channel of this river is now well marked at night. Considering the cost of maintenance, these lights are among the most efficient aids to navigation. Two beacon lights shown from pile beacons were established May 25, 1896, in Neuse River, North Carolina, and meet the requirements of the local traffic on this river.

BUOYAGE.

The buoyage of the district was well maintained by the tenders. The loss of buoys and appendages during the past winter was small compared with the previous year, as the spar buoys were substituted for iron buoys before ice made. During the year 7 buoys in Cherrystone Inlet, Virginia, 4 in Hungers Creek, Virginia, 2 in Pamlico River, North Carolina, 1 in Jackson Creek, Maryland, 1 in Chester River, Maryland, 2 in Neuse River, North Carolina, and 7 in North Landing River, North Carolina, were discontinued because they were no longer needed. Several wrecks were temporarily buoyed, and when removed the buoy was taken up. New buoys were established, 1 at Swan point, Potomac River, 1 in the channel from North Point to Worton Point, Chesapeake Bay, 1 to mark the east end of Harrison Bar, James River, 1 off Standard Point, Ocracoke Inlet, North Carolina, 1 off Cobb Point, Pasquotank River, North Carolina, and 3 to mark the anchorage limits of Newport News, Va. On June 5, 1896, a bell buoy was substituted for the first-class nun buoy marking the north end of Craney Island Flats, entrance to Elizabeth River, Virginia. As the necessities of navigation demanded, changes were made in buoys and others were moved, all of which appear to have improved the service. Core Sound, North Carolina, was restaked in May under the supervision of the buoy master of those waters, and that useful channel for small craft is now well marked. An experimental current bell buoy of the Woodworth pattern has been in position for about six months and seems to be an efficient buoy for inland waters. Its principle is good, the motion is constant, and the ringing of the bell is uninterrupted.

DEPOTS.

Lazaretto Point, Baltimore, Md.—The following recommendation made in the Board's last six annual reports is renewed:

> Attention is invited to the necessity of providing a dwelling at this depot for the accommodation of the depot keeper and his family. Their quarters in the warehouse are unsuitable and uncomfortable, and even were the rooms not required for other purposes, it would cost nearly as much to make them comfortably habitable as it would to build a new dwelling. About one-third of the space on the upper floor is reserved for the use of custom-house inspectors, and the large and increasing amount of work on hand in the district demands the use of all storage and shop room available. The depot keeper must be constantly on the spot, and can not live away from the premises. There is ample room on the Government tract for such a building as is required, and it can be built for $2,500. An appropriation of this amount is earnestly recommended.

Portsmouth, Va.—In May 384 running feet of fencing, with the necessary gates, were built to inclose the lot adjoining the depot.

The following recommendation made in the Board's last annual report is renewed:

> The purchase in 1892 of additional land for the purpose of increasing the wharf and storage facilities, has resulted in nothing, as no appropriation was made for the necessary improvements, which include the extension of the wharf and the putting of the depot in thorough order. It is now a vacant lot, the resort of idle boys, and a source of care and annoyance to the custodian.
>
> The Board is now of opinion that the needed repairs can be made for say $15,000, and it is recommended that an appropriation of this amount be made therefor.

Point Lookout, Maryland.—An oil house was built. This depot, which meets all the requirements of the service, is in charge of an efficient keeper.

Annapolis, Md.—On June 6 the lands opposite Annapolis, Md., formerly used as the naval proving grounds, were transferred to the Light-House Establishment for use as a light-house depot. A stock of buoys and appendages will be sent thither by the tenders as opportunities occur.

Long Point, North Carolina.—The water front was repaired, as were the buildings and slips for the steam launch *Bramble.*

Washington, N. C.—The wooden bulkhead, 192 feet long, on the river front was substantially rebuilt, and the fences around the lot renewed. The lower part of the custodian's dwelling, which is built on piers, was inclosed by boards, so as to form a weather-tight room and correspond with the upper stories. A platform for buoy chains and another for the use of vehicles entering the yard were made. Various minor repairs were made.

TENDERS.

The Maple.—This steel twin-screw steamer was in active service during the whole year. She steamed 19,730 miles on a consumption of 1,620 tons of bituminous coal. She was employed 95 days on inspection duty, 85 days working buoys and attending to light-vessels, and 41 days in delivering fuel, rations, and supplies to light-stations and vessels. She was under repair 16 days, and at the depots coaling, loading supplies and buoys, or at other necessary work, 69 days. In September she was hauled out, her bottom was cleaned and painted, her boilers blown off and cleaned, the whole vessel renovated and given a fresh coat of paint, and the old foremast taken out and a new one put in place. During the year she has worked 367 buoys, visited 253 light-stations, delivered 203 tons of coal and 177 cords of wood, and left rations at 36 stations. The crew of the vessel were employed 19 days at the depots in cleaning and painting buoys. In October she transported the new steam receiver for Cape Charles light-vessel from Norfolk, Va., to the ship.

The Violet.—This wooden side-wheel steamer was in commission during the entire year, and was actively engaged in the work incident to the service. In July her engine was overhauled and lined up, and her paddle wheels were repaired in April. She was laid up a few days in September and given a thorough cleaning and new paint. During the year she steamed 13,626 miles on a consumption of 712 tons of bituminous coal. She was employed 80 days inspecting lights, 65 days attending to the buoyage, and 70 days in delivering fuel, rations, and supplies, including in this duty the annual supplies and oil to all the lights on the inland waters of North Carolina. She was laid up 10 days for repairs during the year, and was 79 days at depots loading or unloading, coaling, or with the crew at work on buoys. She has delivered 120 tons of coal and 71 cords of wood at 28 stations and rations at 18, made visits at 209 lights for the purpose of inspection and supply, worked 503 buoys, and the crew has worked 26 days at the depots cleaning and painting buoys.

The Bramble.—This steel twin-screw steam launch, used to supply gas to the beacons in Currituck Sound, North Carolina, was constantly employed on her special duty. The engine and boiler were thoroughly repaired in August, a new set of grate bars was furnished in April, and in June she was hauled out and cleaned. During the year she has run 1,761 miles on a consumption of 44 tons of bituminous coal.

The Jessamine.—This iron side-wheel steamer was employed except while under repair and during 14 days in January, when, because of storms and low tides, she was detained in the Albemarle and Chesapeake Canal. Her chief work was in connection with the repairs of light-houses. She carried materials, cared for working parties, and assisted in other ways in the repairs and improvements made at forty stations. She inspected the majority of the light-stations in the district in order to ascertain their needs. She transported and assisted in the installation of the illuminating apparatus at Solomons Lump, Cape Charles, and Hog Island stations, and conveyed some of the materials used in the construction of the last-named work. She was used to make examinations and test borings at Northwest Point Royal Shoal light-house preliminary to the strengthening of that structure. In the performance of the work above outlined she steamed about 7,534 miles on a consumption of some 572 tons of coal. Between October 11 and 14, November 6 and 9, 1895, and from May 28 to June 11, 1896, she was laid up for repairs.

The Thistle.—This wooden screw steam tug was engaged in the transportation of material for and in otherwise assisting in the construction of the Hog Island light-station and in connection with the repairs of Seven-Foot Knoll, Fort Washington, Blackistone Island, Leading Point, and Thomas Point Shoal light-houses, and of the North Carolina light-stations. During the greater part of March she was disabled by the breaking of the propeller screw. From December 10 to 15 and for 20 days in June she was under repair.

SIXTH DISTRICT.

This district extends from, but does not include, New River Inlet, North Carolina, to and including Jupiter Inlet light-station, Florida. It embraces all aids to navigation on the seacoasts, bays, sounds, harbors, rivers, and other tidal waters of North Carolina, South Carolina, Georgia, and Florida between the limits named.

Inspector.—Commander M. R. S. Mackenzie, United States Navy, until May 25, 1896; since then Commander Seth M. Ackley, United States Navy.

Engineer.—Capt. Eric Bergland, Corps of Engineers, United States Army, to November 6, 1895; Maj. Ernest H. Ruffner, Corps of Engineers, United States Army, to December 31, 1895; since then Capt. Frederic V. Abbot, Corps of Engineers, United States Army.

In this district there are—

Light-houses and beacon lights, including 112 post lights	201
Light-vessels in position	3
Day or unlighted beacons	48
Fog signals operated by steam	2
Fog signals operated by clockwork	3
Whistling buoys in position	7
Bell buoys in position	16
Other buoys in position	296
Steamer *Wistaria*, buoy tender, and for inspection and supply	1
Schooner *Pharos*, for construction and repair	1

LIGHT-HOUSES.

—. *Cape Fear, seacoast of North Carolina.*—The following statement, which was made in the Board's last seven annual reports, is renewed:

> The shoals forming the continuation of this cape for about 18 miles to the southeast are dreaded by shipmasters only a little less than those at Cape Hatteras. At present a light-ship near the outer extremity of the shoals warns vessels of danger and gives them a good point of departure. This aid to navigation can not be dispensed with; but it is not sufficient to insure adequate protection to the large number of domestic and foreign vessels attracted to this point by the considerable and increasing trade of the neighboring port of Wilmington, N. C., because of the small area lighted by it, and because of its liability to be set adrift from its moorings during heavy storms, which is the very time when its light is most needed. The present Cape Fear light (Bald Head), on account of its inland position and want of height, does not cover the shoal, and therefore does not give sufficient warning to vessels when the light-ship may have drifted from her moorings. A first-order light-house built on the pitch of Cape Fear, with a radius of 18¼ miles of light, would be seen so far as to give timely warning, and the fact of being near enough to the coast

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to see it would be a sufficient indication that the observer should make a better offing. Other reasons for a first-order light-house here may be found in the better protection it would afford to the bight lying north of the cape, which has been left dark since the discontinuance of Federal Point light-station in 1880. The proposed light would more than compensate for the one discontinued at Federal Point. It may be proper to add that there is no first-order light-house between Cape Lookout, North Carolina, and Cape Romain, South Carolina, a distance of about 170 nautical miles. Recent changes in the lighting of the entrance to Cape Fear River have almost eliminated the Cape Fear light-house (Bald Head) as a harbor light. Its only use is that of a rear beacon to a stake light forming a range to guide up the river after crossing the bar. Upon the establishment of the proposed new light on the pitch of Cape Fear the old light might be discontinued, as the tower and the keeper's dwelling are antiquated and discreditable to the Light-House Establishment.

Urgent petitions have been presented to the Light-House Board by commercial and pilot associations of Wilmington, N. C., and by shipmasters trading to that port, which have had its careful consideration and approval.

It is estimated that a tower 150 feet high, with suitable oil room, keeper's dwellings, and outbuildings, on the pitch of Cape Fear, will cost $70,000, and it is recommended that this amount be appropriated therefor.

602. Cape Fear, entrance to Cape Fear River, North Carolina.—As it is proposed to discontinue this light upon the establishment of a first-order tower upon the pitch of Cape Fear, no expenditures were made at the station.

—. *Range lights for new dredged channels in Cape Fear River, North Carolina.*—The following recommendation made in the Board's last four annual reports is renewed:

> The Board recommended the discontinuance of 10 of the present post lights in the upper part of the Cape Fear River and the establishment of 24 new post lights, which, in connection with certain other ranges already established, would constitute a system of ranges to guide vessels from the Cape Fear entrance to Wilmington, N. C., through channels dredged to a depth of 20 feet at mean low water. As vessels are now carried by ranges one-half the distance between the entrance and Wilmington, and then left without further adequate guidance, the Board is of opinion that to complete the usefulness of the aids to navigation in the lower part of the river similar aids should be provided to guide them to their port of destination. It is estimated that this can be done at a cost not to exceed $3,105, and it is recommended that an appropriation of that amount be made for this purpose.

These channels have already been dredged to the depth of 18 feet.

625–629. Winyah Bay beacons, South Carolina.—These five beacons had been at the date of the last annual report constructed, and were in readiness to receive the illuminating apparatus. They were lighted on August 8, 1895, and have proved of great service to the shipping of the port.

630. Sampit River beacon, South Carolina.—The foundation piles of this beacon, which stands in the water at the confluence of the Pee Dee and Sampit rivers, were spliced, and the superstructure was fitted with new braces. The iron frame for supporting the lantern was lengthened so as to allow of showing two lights of different colors above the roof, as a characteristic which would distinguish it from the riding lights of vessels which anchor in the vicinity, and on October 17 the double light was put in operation.

631. Mother Bunch Island beacon, South Carolina.—This beacon had been constructed at the date of the last annual report and was in readiness to receive the illuminating apparatus. It was lighted on August 8, 1895.

632. Cape Romain, South Carolina.—The eight piles under the boathouse were remetaled and a bridge 20 feet long on metaled piles was built to connect it with the shore. A boat landing, nearer to the station than the boathouse, was also built and connected with the shore by a bridge 210 feet long. The structure was supported by 44 piles, 18 of which were sheathed with yellow metal. Various repairs were made.

634. Bull Bay, South Carolina.—Although this station is in bad condition, repairs to it were confined to the necessary maintenance of the water supply by putting up new gutters and down-spouts. The reason for this course is that the erosion of the site by the sea previously reported has continued at an accelerated rate, and after surveys and careful examination, it seems that works of protection would cost far more than the station is worth. The light itself is of no value as one of the seacoast system, since the radius of Cape Romain light, to the northward intersects with that of Charleston to the southward to the seaward of the Bull Bay light. As a guide to entering Bull Bay Harbor it is also of doubtful utility, since it stands alone and the channel is too narrow to allow vessels to run in on bearings; besides, a record kept by the keeper shows that very few vessels enter or leave Bull Bay.

642. Fort Sumpter, front beacon of Swash Channel Range, Charleston Harbor, South Carolina.—A boat shed was built, supported by piles sheathed with yellow metal.

643. St. Philip's Church, rear beacon of Swash Channel Range, Charleston Harbor, South Carolina.—The arrangement made with the vestry of this church continues to be mutually satisfactory, and has worked without friction. Some slight repairs were made to the gaspipe and electric burner.

—. *Wadmelaw River beacons, South Carolina.*—Three beacons were built in the Wadmelaw River, in the vicinity of Enterprise, S. C., to guard vessels against dangerous reefs and flats. They were lighted on June 30, 1896.

653. Hunting Island, South Carolina.—A wooden tramway 3,160 feet long was laid down between the station and its boat landing, and the embankment at its water end was strengthened by 600 cubic yards of sand and mud. The roof of the dwelling was repaired and 80 running feet of low plank walk was built.

Sixth District.

655, 656. Hilton Head Range, South Carolina.—The channel across the bar through which this range is intended to guide has continued to work to the southward, and it will soon become necessary to again move the front beacon to adapt the range to the new water.

—. *First and Second Cut ranges, Savannah River, Georgia.*—These two ranges were temporarily established for immediate guidance through the new dredged channel near the mouth of the Savannah River, Georgia, pending the construction of the Jones Island and Oyster Beds ranges. Upon the lighting of the latter, these ranges were on August 24, 1895, discontinued.

665, 666. Jones Island Range, Georgia.—The two beacons of this range, which at the date of the last annual report had been built, were on August 24, 1895, lighted.

668, 669. Oyster Beds Range, Georgia.—The front beacon of this range, which at the date of the last annual report had been built, was on August 24, 1895, lighted.

674. Venus Point, Savannah River, South Carolina.—A lens lantern was substituted for the locomotive-headlight lantern formerly in use when this beacon constituted the rear light of the discontinued Venus Point Range light.

681. Barnwell Place (Oglethorpe Range rear) beacon, South Carolina.—At the time of the establishment of the Oglethorpe Range (front) beacon the Barnwell Place post light was constituted the rear beacon of the new range, and its characteristic was on December 10, 1895, changed from fixed red to fixed white.

682. Proctor Place beacon, Georgia.—This beacon, consisting of a cluster of three piles driven at the channel end of a training wall in the Savannah River, which had proved dangerous to the navigation of the river, was built in November, and on December 10, 1895, was lighted.

683. Oglethorpe Range (front) beacon, Georgia.—This beacon, consisting of a cluster of three piles carrying a fixed white Funck lantern, was built in November and lighted on December 10, 1895. It makes a range, in connection with the Barnwell Place post light as a rear beacon, to guide past Fort Oglethorpe, Savannah River, Georgia. The range intersects at one end with the Fort Jackson and at the other end with the Fig Island Range, and has proved satisfactory to mariners.

689. St. Catherines Sound, seacoast of Georgia.—At the date of the last annual report proceedings in condemnation, for the purpose of acquiring title to the site selected for this station on St. Catherines Island, had been begun. They had been instituted only after every reasonable effort to secure a purchase of it from the owner on equitable terms had been made without success. The case was heard before the United States court in Savannah, and at its session in November, 1895, the court dismissed the case upon the grounds that the United States had not sufficient authority to condemn the land. In December the

Attorney-General advised the district attorney to begin proceedings in condemnation de novo, under section 4660 of the Revised Statutes, rather than appeal the case. There have been most vexatious delays in bringing the new proceedings to a hearing, but the United States attorney reported on June 17 that he had made up the case, and that he hopes to bring it before the court in a short time.

In the meantime, a new survey had been made of the site, including the road over which a right of way had been asked for in the original proceedings of condemnation, and which is necessary to afford communication between the site and Wâlburg Creek, the natural place for landing supplies. A survey was also made of the south end of Ossabaw Island, and borings were made in the waters of St. Catherines Sound, as possibly affording alternative sites in case the United States failed again in its new condemnation proceedings. Pending the settlement of title, no work has been done on the site.

696–701. Brunswick Harbor ranges, Georgia.—At the date of the last annual report the pile foundations of the six beacons constituting these ranges for the guidance of vessels between St. Simon entrance and Brunswick had been completed, and an agreement was made for the erection of the superstructures, under which the beacons were completed in July, 1895. On September 10 they were lighted.

—. The inside passage from Savannah, Ga., to Fernandina, Fla.—In its last seven annual reports the Board recommended that it be empowered to erect and maintain 25 post lights, in order to facilitate the navigation of the inland passage from Savannah to Fernandina, at an estimated cost of $4,000. An appropriation of this amount has been recommended. This recommendation is renewed.

702. Little Cumberland Island, Georgia.—A new boathouse, 185 feet of picket fence, 125 feet of low plank walk, and 200 feet of sand fence were built. Various repairs were made.

703, 704. Amelia Island Range, Fernandina entrance, Florida.—The structures used for temporary beacons of this range, since the permanent ones were discontinued as misleading, were so changed as to adapt them to carry lens lanterns instead of Funck lanterns. The former were provided and put in place. The dwelling is in danger of being overwhelmed with sand dunes.

705, 706. Tiger Island North Range, Florida.—The Funck lantern lights in use for this range having proved to be too feeble for the proper guidance of vessels, the structures were changed to adapt them to carry lens lanterns, and the latter were provided and put in position.

707, 708. Tiger Island South Range, Florida.—The oil house was raised 16 inches and 180 feet of plank walk was built.

—. Range beacons for the bar and mouth of St. Johns River, Florida.—As six wooden beacons, five to be in the water, are to be established to guide vessels through the jetty channel at the mouth of the river, a

survey was made for their accurate location. Material was purchased and framed, and with the help of a hired pile driver the five water beacons were completed and made ready for the illuminating apparatus by the end of June. The land beacon was completed 4 days later.

711–783 and 785–793. St. Johns River post lights, Florida.—Generally these lights were well kept. Worms have nearly destroyed the piles of many of them, and it will be necessary to renew them during the coming year.

795. Mosquito Inlet, Florida.—The electric apparatus for calling the relief keeper having been destroyed by a lightning stroke, a new apparatus was installed.

797–825. Indian River post lights, Florida.—Owing to the presence of the launch *Water Lily* in this river, affording the inspector opportunity to inspect these lights, there has been a very marked improvement in the care and attention on this river. These lights are to be discontinued on July 1, 1896, as the quantity of shipping on the river, which has much decreased in consequence of the building of competing railroad lines, does not now warrant their maintenance.

—. *Reimbursement of light-keepers for personal losses sustained during the cyclones of August 27 and 28, 1893.*—The following statement, made in the Board's last two annual reports, is repeated:

> A number of keepers of light-houses, the officers and crew of a light-vessel, and the keeper of a buoy depot sustained more or less heavy personal losses when the stations where they were employed were wrecked. Many of them displayed much devotion to the service and incurred great personal danger.
>
> The Board therefore brought these matters to the attention of the honorable Secretary of the Treasury, and he, in letters of November 9 and 16, 1893, and January 29, 1894, to the Speaker of the House of Representatives, transmitted the sworn statements of each keeper as to his losses, indorsed by Commander M. R. S. Mackenzie, United States Navy, inspector of the Sixth light-house district, and recommended that provision be made by Congress for the reimbursement of the losses sustained by these keepers. The losses, as shown in these statements, amount to $2,399.13. Recommendation is made that an appropriation of that amount be made for the reimbursement of losses sustained by the light-house employees in the Sixth light-house district.
>
> Similar losses were sustained by light-keepers in the Eighth light-house district during the hurricane of October 1, 1893. Statements of the losses they sustained, duly approved and indorsed by the light-house inspector, were sent to the Speaker of the House of Representatives by the Treasury Department in its letters of January 29, March 7, and April 3, 1894, with recommendation that reimbursement be made. The sum of these losses, as stated, amounts to $2,603.62. Recommendation is made that an appropriation of this amount be made for the reimbursement of the losses sustained by light-house employees in the Eighth light-house district.

Sixth District.

REPAIRS.

At each of the following-named stations repairs of greater or less extent were made during the year:

624. Georgetown, S. C.
636, 637, 638. Charleston and Morris Island (north and south ranges), S. C.
646. Sullivans Island Cove Pierhead, S. C.
661, 662. Bloody Point, S. C.
667. Cockspur Island, Ga.
675. Jones Island, S. C.
692, 693. Wolf Island, Ga.
709. Amelia Island, Fla.
784. Volusia Bar, Fla.
826. Jupiter Inlet, Fla.

LIGHT-VESSELS.

601. Frying Pan Shoals light-vessel, No. 53, off the seacoast of North Carolina.—On October 6, 1895, this vessel was relieved by relief lightship No. 29 and brought to Charleston, where she was hauled out, repaired, thoroughly cleaned, and painted. She was replaced on her station November 12, 1895, and light-vessel No. 29 was taken to Charleston. On December 20, 1895, she broke adrift and went into Southport under her own steam, and was replaced on her station by the tender two days later.

635. Charleston light-vessel, No. 34, off Charleston Harbor, South Carolina.—No repairs being needed, this vessel was not moved from her station during the year.

654. Martins Industry light-vessel, No. 1, off the seacoast of South Carolina.—This vessel was taken to Charleston on June 20, 1895, and replaced by relief light-vessel No. 29. She was hauled out on the railway at Charleston, stripped, felted, calked, and remetaled, and put in good repair. The keel was cut out and straightened, a new set of masts were put in, a new gang of rigging was fitted, new chains and fittings for the lantern houses were put in, a new stem was put in, a new caboose, a new set of awnings complete, and new dead-eyes all around were supplied. Four stanchions for awnings were made and set up and a new staysail was furnished. She was also supplied with various articles of outfit for the engineer's department, and other supplies. She was replaced on her station August 20, 1895, and light-vessel No. 29 was towed to Charleston.

Relief light-vessel No. 29.—This vessel is kept as a relief light-vessel at Charleston, S. C. On June 20, 1895, she relieved light-vessel No. 1 on Martins Industry Shoal, allowing No. 1 to be taken in for considerable repairs. On August 20, 1895, she was relieved by light-vessel No. 1 and towed to Charleston. On October 6, 1895, she relieved light-vessel No. 53 on Frying Pan Shoals, and after light-vessel No. 53 had been towed to Charleston and thoroughly overhauled she was replaced on her station November 12, 1895, and light-vessel No. 29 was towed to Charleston.

Sixth District.

DAY OR UNLIGHTED BEACONS.

There are in this district 48 day or unlighted beacons, most of which are in good condition.

FOG SIGNALS OPERATED BY STEAM.

601. Frying Pan Shoals light-vessel, No. 53, North Carolina.—This 12-inch steam whistle was in operation some 49 hours during the year, the fogs at this station being of short duration, and consumed some 4 tons of coal and about one-eighth of a cord of wood.

654. Martins Industry light-vessel, No. 1, South Carolina.—This 12-inch steam whistle was in operation some 139 hours, and consumed about 12 tons of coal and one-half of a cord of wood.

BUOYAGE.

The buoyage of the district is in excellent order, and but few buoys went adrift. All the buoys south of Charleston were relieved, and those north will be relieved next month. Nine buoys were discontinued, 3 were renumbered, 6 were established, 20 were replaced, and 18 were repaired. Six fourth-class buoys and 28 sinkers were purchased in the district, and 18 tubes and brackets for bell buoys, 1 bell buoy, 3 can buoys, 30 sinkers, 1 bridle chain, 1 ballast ball, 200 shackles, and 4 swivels were supplied from the general light-house dépot.

DEPOTS.

Castle Pinckney, Charleston Harbor, South Carolina.—Slight repairs were made to the storehouse and keeper's dwelling and extensive repairs were made to the wharf. The boathouse was replaced. The upper portion of the dock was repaired. The stores are in good order, but the floor of the storehouse is below storm tides, and the stores are liable to be damaged if not destroyed in case of a hurricane.

—. *Depot for the Sixth light-house district.*—The present depot is on a small marshy island in the harbor at Charleston. It is exposed to storms, and was partly destroyed by the hurricane of 1893, when many stores and much material was lost and heavy damage was inflicted on the wharf and buildings. The same hurricane nearly wrecked one of the light-house tenders which was then lying at the custom-house wharf in Charleston. A suitable depot is much needed in this district for the storage of building materials and supplies, spare buoys, etc., and one which can afford safe harbor for light-house vessels. It should be located at some point sheltered from the violent storms prevalent on the southern coast during certain seasons of the year. It is estimated that a proper depot can be established for $35,000, and it is recommended that an appropriation of this amount be made therefor.

Sixth District.

TENDERS.

The Wistaria.—This iron side-wheel steamer was constantly employed. She replaced and relieved 409 buoys, repaired 11, recovered 6, repainted 482, repaired 197 buoy chains, did 23 days' work at the depot, supplied the light-vessels, and delivered extra supplies to light-stations. She made the usual quarterly inspection trips and towed the light-vessels to and from their stations. She steamed about 14,245 miles, and in doing so consumed some 824 tons of coal and 14 cords of wood. She was 64 days and 4 hours in motion, 227 days under steam, and 138 days without fires. Her 24-foot steam launch was of great service in the inspection of the district. In many places the inspector is compelled to go from 1 to 13 miles by boat, and frequently in weather in which a boat under oars could make little progress. The use of this boat not infrequently saves a delay of an entire day in the inspection of one station, and she requires but two men to run her, whereas a boat under oars would require the services nearly of one-half the crew of the tender. Especially is her service useful during the summer season, when the excessive heat is quite trying on the men.

The Pharos.—This schooner was engaged during July and August in completing the Savannah River Range beacons, Georgia. During September she was engaged in repairs at Georgetown light-station and Sampit beacon, South Carolina.

During October and November she made extensive repairs at Cape Romain light-station, South Carolina, and smaller ones at Cockspur, Georgia, and Jones Island, South Carolina. During December she made a survey of the beach line of Bull Bay light-station, South Carolina, and laid a new tramway 3,160 feet long at Hunting Island, South Carolina. During January she made full surveys of the site selected on St. Catherines Island, Georgia, for St. Catherines Sound light-station, and of alternative sites on Ossabaw Island and in the waters of St. Catherines Sound. During February she made repairs at Bloody Point light-station, South Carolina, and at Wolf Island light-station, Georgia. During March and April she made extensive repairs at Little Cumberland Island light-station, Georgia, and adapted the structures of the Amelia Island Range and Tiger Island North Range for the reception of lens lanterns. During May she assisted in making repairs to the wharf at Castle Pinckney depot, South Carolina, and made preparations for building three ranges for St. Johns River Bar, Florida. During June she made surveys for actual location of the St. Johns River Bar ranges and completed the whole work of construction, excepting the erection of one rear beacon. The *Pharos* is in very good condition, but requires the usual overhauling of rigging and ballast, and painting. In August, 1895, rigging and ballast were overhauled, her decks were calked, and she was painted.

Sixth District.

Launch Water Lily.—This 65-foot naphtha launch was received from the contractors in New York on October 30, 1895. She left New York November 3 and steamed to Charleston, arriving there November 21, making nearly the entire distance by the inside route, running during daylight only. The crew consists of a master, two firemen, and a cook. Since she was accepted she has never required the services of an engineer, but has been managed and repaired by her crew. On December 5, 1895, she was sent to the St. Johns and Indian rivers, Florida, where she has been almost continuously engaged. From December 8, 1895, to January 8, 1896, she was employed in inspection work and in building and repairing beacons on the St. Johns River. With the assistance of a pile driver and two laborers she built ten 3-pile beacons and one 2-story 28-foot 4-pile beacon. On January 19 she left Jacksonville for the Indian River, arriving at Mosquito Inlet on January 21. From the last-named date to the 29th she was engaged in delivering the supplies landed by the supply steamer *Armeria* at Mosquito Inlet light-station to the Indian River post lights as far south as Jupiter, Fla., and bringing the empty oil cans back to Mosquito Inlet light-station. During February, March, and April she was engaged in inspection and various other work on both the Indian and St. Johns rivers. In May and June, with the assistance of a pile driver, she built five 3-pile beacons and erected one 2-story 4-pile structure on the lower St. Johns River, and repaired and repainted all the post lights between Jacksonville and the mouth of the St. Johns River. On June 26 she was sent to the Indian River, Florida, to dismantle all post lights in that river, as it had been ordered that they should be discontinued on June 30, 1896. From October 30, 1895, to June 30, 1896, she steamed about 5,056 miles, and consumed some 8,682 gallons of naphtha. This consumption of naphtha seems large, but when it is remembered that she does not require the services of an engineer, this expense is comparatively reduced. She is a most useful vessel for this district. Having so light a draft, she can reach many points inaccessible to the larger tender *Wistaria*, which is thus relieved of some work in various parts of the district and of almost the entire work of the St. Johns River. The Board now has under consideration the question of providing another launch similar to the *Water Lily* for the engineer service of construction and repair.

SEVENTH DISTRICT.

This district extends from a point just south of Jupiter Inlet light-station to and including Perdido entrance, Florida. It embraces al aids to navigation on the sea and Gulf coasts of Florida, and on othe tidal waters tributary to the sea and Gulf between the limits named.

Inspector.—Commander William B. Newman, United States Navy.

Engineer.—Maj. James B. Quinn, Corps of Engineers, United State Army.

There are in this district—

Light-houses and lighted beacons	
Day or unlighted beacons	
Whistling buoys in position	
Bell buoys in position	
Other buoys in position	2
Steamer *Laurel*, buoy tender, and for supply and inspection	
Steamer *Arbutus*, for construction and repair in the Seventh and Eighth districts.	
Schooner *Clover*, for construction and repair in the Seventh and Eighth districts.	

LIGHT-HOUSES.

833. Key West, Gulf of Mexico, Florida.—Repairs to the wharf a buoy shed were begun April 20, 1896, consisting of a general overha ing of the wharf and buoy shed, putting down new piles, coveri them with cast-iron pipe, and filling inside with cement to protect fr the attacks of the teredo. These repairs were only partially complete

836. Dry Tortugas, on Loggerhead Key, the westernmost key of the T tugas group, Florida.—Some 728 feet of wire fence were put up a painted. Various minor repairs were made.

837. Tortugas Harbor, Fort Jefferson, Garden Key, Tortugas gro Florida.—Some 380 feet of wire fence were put up and painted. Va ous minor repairs were made.

844. Egmont Key, entrance to Tampa Bay, Florida.—New boat dav were built and put in and new cisterns erected, two winches were p in, and minor repairs were made. Estimates for extensive repairs we made, material was obtained, and the work was continued until Ju 30, 1896. All work was done by hired labor. This light was chang from fourth to third order, and red sectors were inserted. Steps being taken to put the wharf in proper repair.

A new dwelling is needed for the assistant keeper. It has b recommended in the Board's last three annual reports. It is now e mated that it can be built for $3,500, and it is recommended that appropriation of this amount be made therefor.

7

Seventh District.

Tampa Bay and Manatee River beacons, Florida.—These five beacons were completed on October 26, 1895. Three were located in Tampa Bay and two in Manatee River. The two in Manatee River were lighted beacons. The lanterns were placed and lighted May 20, 1896. They are 4-pile wooden beacons, with upper parts in lattice work. The odd-numbered ones are painted black and the even-numbered ones red. Those in Tampa Bay are called Point Pinelos, No. 1, day; West End of Middle Ground, No. 4, and South End of Middle Ground, No. 5. Those in Manatee River are called Snead Point Shoal beacon, No. 1, outer, and Manatee River Cut beacon. A pair of clamps were repaired and placed on Middle Ground beacon, No. 4.

856. St. Marks, entrance to St. Marks River, Florida.—Extensive repairs were made to the wharf and boathouse. A new fence inclosing the buildings was built. Minor repairs were made to the buildings.

861. Crooked River (rear), St. George Sound, Florida.—The contractors completed their work on August 12, 1895, ready to receive the illuminating apparatus. The light is a fourth order, showing two flashes every 10 seconds. The height of the focal plane above mean high water is 115 feet and 2 inches. On October 28, 1895, the light was first exhibited. Contract was made for the erection of an oil house, which was completed on February 21, 1896.

863. Apalachicola Bay front beacon, on the dredged channel leading into Apalachicola Bay, Florida.—The following recommendation which was made in the Board's last two annual reports is renewed:

> This beacon was erected in 1887, and paid for from the special appropriation for Apalachicola Bay range lights, Florida. In August, 1890, the beacon was destroyed by a tug; it was rebuilt, and destroyed again by the same tug and a tow of barges in November, 1891; it was restored the second time, and was again knocked down by a tug in February, 1894. A single-pile beacon was established in its place by local interested parties. From an examination of the foundation soil it is evident that it would be imprudent to erect an ordinary pile beacon. It is therefore recommended that a more substantial structure be placed there, on a pile and concrete foundation, with a cylindrical concrete superstructure. It is estimated that the construction of such a beacon will cost not exceeding $7,000, and it is recommended that an appropriation of this amount be made therefor.

—. *Beacons in Apalachicola Bay, St. George Sound, and at Cedar Key, Florida.*—There are six of these beacons, five of which are lighted. They are similar to those in Manatee River and Tampa Bay. Specifications and drawings were made, and the beacons, which were built by contract, were completed on June 30, 1896.

865. Cape San Blas, Gulf of Mexico, Florida.—The removal of this tower to the new site on Blacks Island was begun in February and carried on until April 30, 1896, when work was stopped on account of exhaustion of the appropriation. At the time work was stopped it stood as follows:

In house No. 1 the exterior work was nearly completed. stairs and lattice were built and painted, the cistern was in place and pipe connections were made with the gutters, blinds were hung, and the house was painted. Nothing was done on the interior finish.

In house No. 2 the foundation was completed to the top of the brick piers, the kitchen chimney and piers were carried up 6 feet, and the main chimney was brought to the surface ready to receive the brick work.

In the foundation for the tower the piling and grillage are all in place; concrete boxes and all anchor bolts and boxes are put in position. It is estimated that three-fourths of the concrete work is done.

The lens, storm panes, and all parts of the lantern were taken down above the lantern floor, except the stanchions, and were stored at the station. Wooden frames covered with tar paper and canvas are placed over the stairway to keep out the rain. All material, tools, etc., were stored at the station and put in care of the watchman. All of the most valuable material was stored in the new dwelling and in the shed; all rough lumber was piled in stacks and covered. The cement is stored under the house and is covered with canvas. All tools and sundry materials are stored either in the house or in the shop. The pile-driver engine was painted with oil and covered with canvas. The pump was stored in the shop. The skiffs and lighters are properly secured. The provisions are stored in the kitchen, where the watchman will live.

It is estimated that it will cost $4,500 to finish the work, and it is recommended that an appropriation of that amount be made therefor.

—. *Choctawhatchee Bar, west coast of Florida.*—The increasing commerce in this locality, principally in lumber, makes it necessary that the narrow channel forming the entrance to Choctawhatchee Bay should be marked so as to be available at night. It is proposed to establish range lights to mark the channel over the bar at the entrance to this bay. It is estimated that this can be done for $2,000, and it is recommended that an appropriation of this amount be made therefor.

—. *St. Joseph Point, St. Joseph Bay, Gulf coast of Florida.*—The following recommendation was made in the Board's annual reports for eight successive years:

> The fishing fleet on this coast is large. A southerly gale is calculated to drive these vessels upon a lee shore. The only harbor of refuge for some 60 miles is St. Joseph Bay. This is easily accessible in the daytime, but at night it is difficult of entrance without a light. The Board is decidedly of opinion that it would be largely to the interests of the fishing fleet in particular, and the commerce and navigation of the Florida coast in general, should this light be established. A bill for this purpose was favorably reported upon recently by the Senate Committee on Commerce, and the Senate inserted the item in the sundry civil appropriation bill, but as it failed of enactment the recommendation is renewed.

It is now estimated that a sufficient light can be established here for $15,000, and it is recommended that an appropriation of this amount be made therefor.

Seventh District.

REPAIRS.

At each of the following-named stations repairs more or less extensive were made during the year:

829. Alligator Reef, Fla.
830. Sombrero Key, Fla.
832. Sand Key, Fla.
838. Sanibel Island, Fla.
839. Gasparilla Island, Fla.
848. Indian Hill, Fla.
857, 858. Carrabelle River Bar beacons, Fla.

DAY OR UNLIGHTED BEACONS.

Day beacons 1, 4, and 5, in Tampa Bay, Florida, were rebuilt.

Florida Reef beacons.—Some of these beacons are down, and all require repairs. They are important as day marks and are of great aid to vessels navigating along the reefs. The beacon on the east end of St. Vincent Island West Pass to Apalachicola Bay, Florida, has been down for some years. Its reconstruction is recommended, as it was an important aid both for the navigation of the pass and the bay.

BUOYAGE.

The buoyage of the district is in good condition. New buoys were established as follows: One to mark the east point of Punch Bowl Shoal, entrance to Miami River, Key Biscayne Bay, Florida; one to mark the Raleigh Rocks in Key West Harbor, Florida; one to mark the south end of the shoal at Hospital Key; one to mark the 3½-fathom shoal at the south end of White Shoal, Southwest Channel, and eight to mark the Northwest Channel, Tortugas, Florida; one to mark the south end of the shoal at anchorage, Port Tampa, Florida. Buoys 3 and 5, old Tampa Bay by South Channel, from Tampa Bay, Florida, were discontinued as unnecessary. In all, 13 new buoys were placed and 2 were discontinued, an increase of the buoyage of the district of 11 buoys. Six buoys went adrift and 2 were sunk by collision, 4 were recovered, and 1 was condemned as beyond repair. Loss for the year 4 buoys, 1 of which, and maybe more, will be recovered.

DEPOTS.

Tortugas Harbor, Fort Jefferson, Gulf of Mexico, Florida.—The buoy shed and blacksmith shop are in good condition. There is no wharf. New gutters and leaders were put on the buoy shed and the cistern was raised and a brick foundation was laid in place of the old wood supports. During the quarantine season, from June 1 to November 1, it is not advisable for the tender to visit or communicate, as it will render her liable to quarantine by the Florida State Health Board at all the ports in Florida.

Key West buoy depot and coal shed, Gulf of Mexico, Florida.—Work was begun in May repairing the wharf and buoy shed. Stringers and plank were replaced where required. The coal and buoy shed were jacked up into line and new piles, cased in iron, driven, and others were pieced out and iron-cased. Work was stopped on June 25, 1896, leaving everything in an unfinished condition. When completed, this depot will be in good condition for some time.

The following recommendation which was made in the Board's last two annual reports is renewed:

> This depot remains much the same as it was when reported last year. It requires extensive repairs to make it usable and to save the wharf and coal shed from complete destruction. This being a sort of halfway station in this long district, it is a very important point from which to work buoys and to send supplies in both directions, and at which light-house steam tenders can take in a supply of coal to make runs among the reef light-houses and with which to return to the mainland. It is estimated that this wharf and coal shed can be put in proper repair for not exceeding $10,000, and it is recommended that an appropriation of this amount be made therefor.

Egmont Key, entrance to Tampa Bay, Gulf of Mexico, Florida.—A cistern was built and davits were put up for hoisting the sailboat. It is unsafe to remain at the wharf except with steam up, and then only in calm weather; but steps are being taken to put the wharf in good repair.

Pennsacola, Fla.—The depot and blacksmith shop are in good condition, but there is no wharf. The navy coal wharf, heretofore used by the tender when working the buoyage of this part of the district, is an utter wreck. The buoys have to be landed on and taken off the beach and painted on the tender, a slow and unsatisfactory mode of doing the work. At this depot 55 buoys were repaired or bushed; 20 first-class, 90 second-class, and 146 third-class shackles were repaired; 400 third-class shackles, 555 first, second, and third class pins, 900 assorted keys, and 35 bushings were made. All the tools needed by the tender for buoy work were made here, as well as the patches for her boiler, and many minor repairs were made here to the vessel and boats. Ten tubular lanterns for beacons were repaired.

TENDER.

The Laurel.—This wooden twin-screw steamer was employed at the regular inspection, supply, and buoy work of the district. Her crew has scaled, cleaned, and painted 300 buoys, changed 260 buoys, landed 14 cords of firewood and 70 rations, and extra supplies at light-stations. She scaled, painted, or whitewashed the towers at Dry Tortugas, Rebecca Shoal, Key West, and Egmont Key light-stations, and worked 114 days at the several depots. She made 90 inspection trips and two special trips with the Naval Board. The engineer's force bushed and patched 20 buoys while away from the depot shop. She was under steam 310 days, and fires were hauled 56 days. In performing this duty she steamed about 9,784 nautical miles, and consumed some 705 tons of bituminous coal. On December 7, 1895, she was taken out of the water. The most urgently needed repairs were made on the hull and spars and on the boiler and engines. While the under-water part of the hull is in fair condition, it is weak. Above the water to the rail the dry rot is general, and she will not stand hard usage. In fact, it is only by careful nursing and taking advantage of fine weather that the vessel has been kept in commission. The boiler is the weakest part. The water legs, flues, and flue sheets require continual patching. The working steam pressure has been reduced to 25 pounds, and would be reduced lower but that the independent circulation will not work with a less steam pressure. The engines are in fair condition, but need a thorough and general overhauling. The first whaleboat and dingy are in good condition. The second whaleboat is of no further service. The awnings, sails, etc., are in fair condition, and will last as long as the vessel. The expense of putting the vessel in good condition for service would probably be more than two-thirds the cost of a new vessel. In her present condition she may be kept in service for a few months more by careful management, but she is not in condition to take any risks during the hurricane months. The boiler is liable to give out completely beyond any temporary repairs at any moment. The work of the district is annually increasing, and is important The necessity for a relief for the *Laurel* at as early a date as practicable by a vessel able to keep the sea in any weather is urgent.

New tender for the Seventh and Eighth light-house districts.—By the sundry civil act approved on June 11, 1896, $37,500 was appropriated for constructing, equipping, and outfitting complete for service a new steam tender for buoyage, supply, and inspection in the Seventh and Eighth light-house districts, and the Board is authorized to contract therefor at a cost not to exceed $75,000. The plans and specifications of the tender are now being prepared, and work will be begun on her at the earliest date practicable.

It is recommended that the sum needed to complete this vessel, namely, $37,500, be appropriated.

EIGHTH DISTRICT.

This district extends from, but does not include, Perdido Entranc Florida, to the southern boundary of Texas. It embraces all aids navigation on the Gulf coast of the United States and tidal wate tributary to the Gulf between the limits named, together with tho on the Mississippi River below New Orleans, and on Grand Lake a Lake Chicot.

Inspector.—Commander Joseph B. Coghlan, United States Navy.

Engineer.—Maj. James B. Quinn, Corps of Engineers, United Stat Army.

In this district there are—

Light-houses and beacon lights, including 18 post lights on the Mississippi River, Grand Lake, and Lake Chicot	
Light-vessels in position	
Day or unlighted beacons	1
Fog signal operated by steam	
Fog signals operated by clockwork	1
Lighted buoys in position (gas)	
Whistling buoys in position	
Bell buoys in position	
Other buoys in position	1
Steamer *Pansy*, buoy tender, and for supply and inspection	
Steamer *Arbutus*, for construction and repair in the Seventh and Eighth districts.	

LIGHT-STATIONS.

875. *Sand Island, off Mobile Point, Gulf of Mexico, Alabama.*—Plan and specifications were made for the placing of riprap stone aroun the foundation of this tower; bids were advertised for, but none wer received. The purchase and placing of this stone in the manne described in the specifications were authorized, and the work was done. But the work does not seem to have been effective in securing the foundation of the tower from erosion.

For several years past the destruction of this station has been threatened by the encroachment of the sea. The island has been cut away to such an extent that the tower and buildings, which are of masonry, are now entirely surrounded by water. The light is of great importance, since it forms one of the systems of coast lights and marks the entrance to Mobile Bay. It is proposed to erect new structures, so designed that if necessary they can be taken down and removed to another safe site should the cutting away of the island continue.

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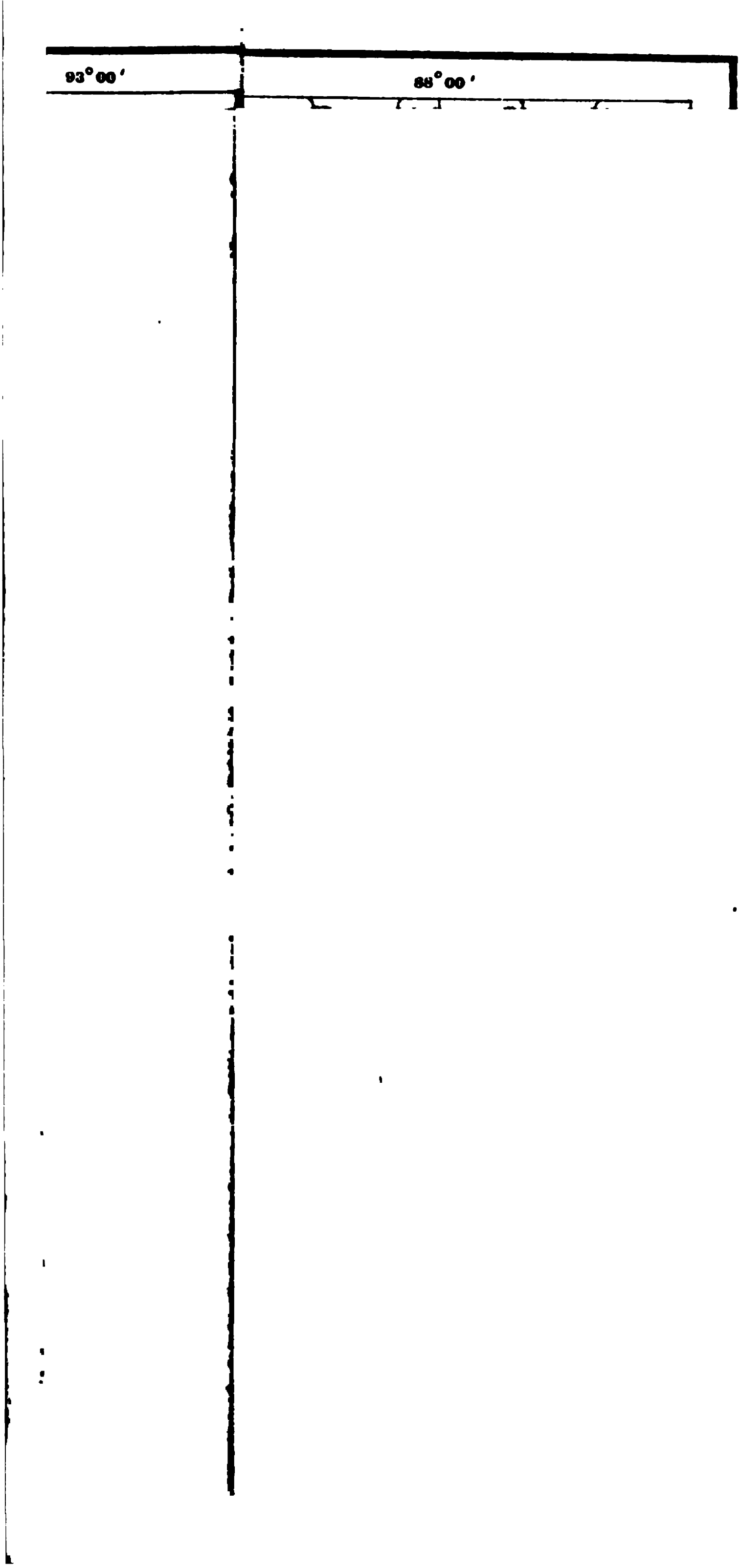

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It is estimated that this can be done for $65,000, and it is recommended that an appropriation of this amount be made therefor.

879–909. Mobile Ship Channel lights, Alabama.—Bids were obtained for the different parts of this work, and contract was made for the metal work for eight square and seven triangular beacons. The metal work was delivered. The contract for the erection of these beacons is being made, and it is expected that the work of erection will be soon begun.

917. Cat Island, Mississippi.—The wharf and boathouse were renovated.

—. Pearl River, on the east bank of the river, about seven-eighths of a mile below the railroad bridge, Mississippi Sound, Mississippi.—The following recommendation made in the Board's last two annual reports is renewed:

> An appropriation of $250 was made by the act approved on March 2, 1889, for the establishment of a light at this point. Continuous but unsuccessful effort has been made to obtain title to a site on which a proper structure could be erected. The difficulty is that the owner can not give such a title as the Government can accept. The legal costs of condemning a site would probably exceed the appropriation. The Board therefore recommends that Pearl River be included in the general appropriation for lighting rivers, when under its provisions a site for the lights can be leased and the light can then at once be established.

921. Point aux Herbes, Lake Ponchartrain, Louisiana.—The breakwater was repaired and extended 160 feet. Various repairs were made.

923. Bayou St. John, Louisiana.—Material was delivered and extensive repairs were made to the dwelling, kitchen, tower, walks, and other buildings.

928. Chandeleur, Gulf of Mexico, Louisiana.—The contract for furnishing the metal work for this station was awarded in August, and the contract for the erection in September, 1895. The metal work was completed and partly delivered. The contractor for the erection of the station has completed the removal of the dwellings and a part of the tower. It is believed that the tower will be completed at an early date.

931. South Pass East Jetty, Louisiana.—Material for a platform was delivered. A walk was built from the east jetty end to the beacon, and two new boat davits and a boat platform were built.

932. South Pass West Jetty, Louisiana.—Materials were delivered and 1,266 feet of plank walk were built.

953. Ship Shoal, Gulf of Mexico, Louisiana.—A contract was made for transporting granite blocks from Fort Pickens, Fla., and placing them around this tower, and the work was completed.

962. Dog River Bar beacon, No. 1, Alabama.—A new platform was built on new stringers. Various repairs were made.

965. Bolivar Point, entrance to Galveston Bay, Texas.—Material for extensive repairs was delivered and the work of general repair was completed.

Eighth District.

—. *Galveston Jetty, Galveston Bay, Texas.*—By the act approved on June 11, 1896, $35,000 was appropriated for establishing a light and fog signal at or near the outer end of one of the jetties, Galveston Harbor, Texas, and changing the characteristics of Bolivar Point light. This work will be done as soon as practicable.

968. Red Fish Bar light-station, Texas.—The boat landing was renewed. Various repairs were made.

The following recommendation made in the Board's last annual report is renewed:

> This light is almost useless as an aid to navigation in its present location. A light upon the edge of the channel which has been cut through Red Fish Bar would be of much service. The buildings of the station have decayed to such an extent that it is impracticable to remove them and place them elsewhere. It is estimated that to reestablish this light on the edge of the channel, where it would be of great use to vessels going through the cut, would cost say $8,000, and it is recommended that an appropriation of this amount be made therefor.

969. Brazos River, Gulf of Mexico, Texas.—This tower was completed on May 14, 1896, and turned over to a keeper on May 30, 1896. It is a skeleton iron structure, painted a dark mineral-brown color. The lantern and watch room are painted black. The tower is about 2½ feet above mean sea level. Its focal plane is 96 feet 7¼ inches above base of tower and 99 feet above mean sea level. Its illuminating apparatus is of the third order, and shows all around the horizon. It shows a revolving white light at intervals of 5 seconds, with a flash of less than one-half second. Construction of outbuildings and other incidental work remains to be done to complete the station.

—. *Reimbursement of light-keepers for losses sustained during the hurricane of October 1, 1893.*—The following recommendation which was made in the Board's last two annual reports is renewed:

> Statements of these losses, to the amount of $2,603.62, approved and recommended by the inspector of the Eighth light-house district, were sent by the Secretary of the Treasury to the Speaker of the House of Representatives in his letters of March 7 and April 3, 1894, with recommendation that reimbursement be made. The Board recommends that an appropriation of this amount be made therefor.

REPAIRS.

At each of the following-named stations repairs more or less extensive were made during the year:

888. Mobile Bay, Ala.
905. Battery Gladden, Ala.
910. Horn Island, Miss.
914. East Pascagoula, Miss.
920. West Rigolets, La.
922. Port Pontchartrain, La.
925. Chefuncte River, La.
926. Pass Manchac, La.
935. Southwest Pass, La.
936. Head of Passes, La.
951. Barataria Bay, La.
966. Fort Point, Tex.
967. Half Moon Shoal, Tex.
972. Brazos Santiago, Tex.

Eighth District.

LIGHT-VESSELS.

930. South Pass light-vessel, No. 43, moored in 82 feet of water, off the South Pass entrance to the Mississippi River, Louisiana.—Two new locomotive tubular boilers were installed, and a lantern mast and lantern doors were furnished. Decks were calked in the after lantern house and a new coaming was placed around the fore-peak hatch. Sundry other repairs were made. Some 120 fathoms of 1⅞-inch chain were received.

964. Galveston light-vessel, No. 28, inside of Galveston Bar, Gulf of Mexico, Texas.—A new iron day mark, two sets of yellow-pine housing chocks and stanchions for boats, and forward and main deck awnings and a wind sail were furnished.

FOG SIGNALS OPERATED BY STEAM OR HOT-AIR ENGINES.

930. South Pass light-vessel, No. 43, Louisiana.—The 12-inch steam whistle was in operation some 254 hours, and consumed about 16 tons of anthracite coal.

BUOYAGE.

The buoyage of the district was kept in good order by the tender. The loss of appendages caused from buoys adrift, etc., was slight.

DEPOT.

Port Eads, Louisiana.—The light-house depot buildings are in fair condition. The depot is small and crowded, hence many buoys, sinkers, etc., remain in the open air exposed to the rain and hot sun.

TENDERS.

The Pansy.—This twin-screw steamer was engaged in caring for the buoys, delivering fuel, provisions, and supplies to the light-houses and light-vessels, and in conveying the inspector on his regular visits of inspection. The lighting outfit was replaced by electric lights and a search light was furnished and installed. The electric light and search light have proved to be of value. Various repairs were made during the year.

Ten days were spent by the crew in cleaning and overhauling buoys and their appendages, and also in improving the general condition of the light-house depot grounds. The tender replaced 12, recovered 5, changed 121, and cleaned and painted 181 buoys. She also erected 4 and moved 5 post lights and cut about 4 acres of willows. She steamed some 8,979 miles, and consumed about 466 tons of coal.

The Arbutus.—This twin-screw steamer is now under repair. Plans and specifications were made for the repair of the deck and hull and for a new boiler; bids were obtained and contracts made.

Eighth District.

New tender for the Seventh and Eighth light-house districts.—By the sundry civil act approved on June 11, 1896, $37,500 was appropriated for constructing, equipping, and outfitting complete for service a new steam tender for buoyage, supply, and inspection in the Seventh and Eighth light-house districts, and the Board is authorized to contract therefor at a cost not to exceed $75,000. The plans and specifications of the tender are now being prepared, and work will be begun on her at the earliest date practicable.

It is recommended that the sum needed to complete this vessel, namely, $37,500, be appropriated.

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NINTH DISTRICT.

This district includes all aids to navigation on Lake Michigan, Green Bay, and tributary waters lying west of a line drawn across the Straits of Mackinac just east of Old Mackinac Point light-station, Michigan.

Inspector.—Commander James H. Dayton, United States Navy.

Engineer.—Maj. Milton B. Adams, Corps of Engineers, United States Army.

There are in this district—

Light-houses and beacon lights	100
Light-vessels in position	4
Fog signals operated by steam	27
Fog signals operated by clockwork	8
Buoys in position	98
Steamer *Dahlia*, buoy tender, and for supply and inspection	1
Steamer *Amaranth*, engineer's tender, for repairs and construction	1
Steamer *Warrington*, engineer's tender, for repairs and construction	1
Steam launch *Lotus*, for construction and repair	1

LIGHT-STATIONS.

1471. McGulpin Point, Straits of Mackinac, Michigan.—The metal work for an oil house was purchased and delivered at the light-house depot. A well was drilled 27 feet deep, a force pump and piping were provided, and a good supply of water was secured for domestic purposes.

1472. St. Helena, Lake Michigan, Michigan.—A brick oil house with metal door, roof, and shelving was erected, and the grounds around the oil house were graded. Minor repairs were made.

1476. Waugoshance, Lake Michigan, Michigan.—The metal work under contract and the lumber under contract for the concrete protecting pier were furnished, and the contracts were completed in August, 1895, but owing to the lateness of the season operations could not be begun. Bids were obtained for furnishing additional material. The greater portion of the material for the construction of the concrete protection was purchased and loaded on the tender *Warrington* in April, and the working party all organized ready to start for the station early in May. On April 22 a contract was made for furnishing the cement required in constructing the concrete protection, and the delivery was completed in June. The tender *Warrington*, with working party, arrived at St. Helena on May 4 to establish a stone-crushing plant and a depot for materials, and repairs to the wharf were begun. All deck planking and other available lumber and timber were laid down for stone platforms, giving about 13,000 square feet of storage room. The stone crusher and engine were erected and 171 cubic yards of stone were crushed. A working party was landed at Waugoshance on May 21, and crib lumber and round iron were taken from Sheboygan light-station and the timber used for stone platforms on the wharf at St. Helena. About 27,000 feet B.M. of old timber and 33 cords of stone were removed from Waugoshance crib. The *Warrington* obtained about 65 cords of stone, and 12 cords were gathered at St. Helena, making in all 79 cords. During June 155,000 feet B.M. of old timber were removed, 1,712 feet of new lumber for leveling walls for steel casings were framed, 205 cords of ballast stone were handled, of which 89 cords were transported to St. Helena, 70 cords stored on the pier, and 46 cords, principally building refuse and bowlders, thrown into the lake, and at St. Helena 98 cubic yards of stone were crushed. The outer walls of the pier were all cut down to below water line, the northwest side was rebuilt, and steel casings and ties placed on the northwest and partly on the northeast and southwest sides. The balance of the walls are now being leveled up for the angle irons. Some 65 cubic yards of concrete were placed, and about 12 of them in bags on the northwest side, where the crib work was partially reconstructed. The casing was immediately backed with concrete. Since the first landing at Waugoshance on May 21, nearly six weeks, there have been only two weeks of fair weather. During the remainder of the time high winds and seas have interfered with the work. The swamping of the lighters and loss by stranding on the reefs was often imminent.

1479. Beaver Island, Lake Michigan, Michigan.—An extension to the water-supply crib was built. Various repairs were made.

1480. Little Traverse, Lake Michigan, Michigan.—A fog bell was established June 1, 1896. The fog-bell tower was erected, consisting of a square pyramidal frame structure, of two stories, resting on five brick piers. The bell is hung in one of the openings of the second story. The color of the structure is buff, with red roof. The striking apparatus and bell, which were in use at Manitowoc, were placed in position. Various repairs were made.

1482. South Fox Island, Lake Michigan, Michigan.—A 10-inch steam fog signal was established and put in operation December 10, 1895. The plant consists of duplicate marine boilers, with Crosby automatic signals, contained in a substantial frame building 22 by 40 feet in plan, covered with 2-inch planking and corrugated iron outside and boarding with smooth iron inside. The walls between studs are filled with sawdust and lime filling. The machinery stands upon a concrete floor. A brick oil house was built, with an iron door, shelving, and roof. Some 115 running feet of sidewalk were laid, one set of stringers and 20 feet of deck were placed on the water-supply pier, and

Ninth District.

the slope of the bank in front of the signal building was covered with brush to prevent cutting away.

1483. Grand Traverse (Cat Head), Lake Michigan, Michigan.—A brick oil house was erected. Various repairs were made.

The following recommendation made in the Board's last annual report is renewed:

> The establishment of a fog signal here is deemed necessary to navigation. It is estimated that it will cost not exceeding $5,500, and it is recommended that an appropriation of this amount be made therefor.

1485. North Manitou, Lake Michigan, Michigan.—Steps were taken to obtain title to a site by condemnation in September, 1895, and the matter has since then been in the hands of the United States attorney. Plans and specifications for duplicate fog-signal boilers and machinery were made. Bids were opened April 15 and a contract was made. Plans, specifications and advertisement for a keepers' double dwelling and a brick fog-signal house were made, and plans and specifications were made for the minor structures. It is expected that these buildings can be completed under contract this season. Plans for the metal tower are being prepared.

1486. South Manitou, Lake Michigan, Michigan.—Bids were opened April 15 for furnishing duplicate fog-signal boilers and appurtenances. A contract was made. Various repairs were made.

1489, 1490. Portage Lake Pierhead Range, Lake Michigan, Michigan.—This station consists of two lights on the Government pier, but there is no dwelling here for the keeper. It is estimated that an appropriate structure can be erected for $3,500, and it is recommended that an appropriation of this amount be made therefor.

1495, 1496. Ludington Pierhead Range, Lake Michigan, Michigan.—The establishment of a keeper's dwelling was authorized by the act approved February 15, 1893, at a cost not to exceed $4,500, but no appropriation has yet been made. It is now recommended that an appropriation of $4,500 be made for this purpose.

1505. Muskegon Lake beacon, Michigan.—The structure from which this light was shown was pushed over by the ice in January. Five piles were driven 100 feet to the westward of its former position, braced and decked with plank, and a small lamp house built at the foot of the post from which the light is suspended.

1506. Grand Haven Pierhead, Lake Michigan, Michigan.—Work on the removal and rebuilding of the fog-signal house was continued. The space in the old elevated walk 63 feet long, caused by the removal of the fog-signal house, was filled in with new walk. Various repairs were made.

1513, 1514. St. Joseph Pierhead, Lake Michigan, Michigan.—The sundry civil appropriation act passed June 11, 1896, appropriated $5,000

Ninth District.

for the establishment of a steam fog signal. Plans and specifications for duplicate fog-signal boilers and machinery were made.

1517. Calumet Pierhead, Lake Michigan, Michigan.—The lumber required for renewing the elevated walk was contracted for. Some 900 feet of the new elevated walk was completed. The metal work of the tower was completed under contract, but owing to the insecure condition of the pier the erection was postponed until the United States engineers finish the new superstructure. The metal work was stored at the light-house depot. Various repairs were made.

—. *Chicago River, Lake Michigan, Illinois.*—An estimate of cost for repairs to the wharf and bulkhead or revetment was made. Contract was made for furnishing the lumber and bolts required in renewing the revetment pier. The work was begun during April, and was completed in May, 1896.

1529. Racine Pierhead, Lake Michigan, Wisconsin.—A fog bell was established. The pierhead tower was moved to the outer end of the pier, and the sixth-order fixed red light was reestablished therein on June 18, 1896. The conduit lantern light was discontinued and the conduit was taken down. Some 438 feet of elevated walk was built.

—. *South Milwaukee, Lake Michigan, Wisconsin.*—The following statement made in the Board's last three annual reports is repeated:

> Recommendation was made through the proper channel to Congress in February, 1893, for the establishment of a light at this place. South Milwaukee is a village about 10 miles south of the city of Milwaukee. It is a thriving manufacturing place of some 1,200 inhabitants. There is a large business done here in building materials. It is claimed that it will double its population within a year. The Board is of the opinion that a light should be established on the north pier of the harbor. It is estimated that it will cost say $7,500, and it is recommended that an appropriation of this amount be made therefor.

1532. Milwaukee Pierhead, Lake Michigan, Wisconsin.—A drive well was put down. Contract was made for furnishing duplicate fog-signal boilers and appurtenances.

—. *Sheboygan Pierhead Range (front), Lake Michigan, Wisconsin.*—The conduit light was discontinued September 30, 1895. The elevated conduit was taken down and stored.

1536. Sheboygan Pierhead, Lake Michigan, Wisconsin.—Bids were obtained for furnishing the materal needed in the construction of a fog-signal station. The beacon was moved about 230 feet to the outer end of the pier on September 30, 1895, and 280 feet of elevated walk was built. A 10-inch steam fog whistle was established March 5, 1896. The plant consists of duplicate, square, open-bottom marine boilers and two Crosby automatic signals, contained in a substantial frame building, sheathed and covered inside and outside with iron. The frame is filled in with sawdust and lime filling. The building stands on a timber substructure, raised 5 feet above the top of the pier.

1538. Manitowoc Breakwater, Lake Michigan, Wisconsin.—A steam fog signal was established on the outer breakwater November 30, 1895. It consists of 10-inch whistles, duplicate, square, open-bottom marine boilers, Crosby automatic signals, contained in a substantial frame building, sheathed and covered with iron inside and outside. It is located on the southeast end of the breakwater, raised upon a frame substructure. An inclosed lantern was built and placed upon a gable end of the building and a lantern light established on November 30, 1895. A boat shed was built on the breakwater. The placing of a parabolic reflector over the fog whistle at this station similar to the one at Duluth, Minn., was begun, and was nearly completed at the end of June.

1539. Manitowoc Pierhead, Lake Michigan, Wisconsin.—Some 50 running feet of retaining wall 9 feet high was built. The work of rebuilding the keeper's dwelling was begun in September and completed December 27, 1895. The structure is a double dwelling of frame on a brick foundation, containing cellars, measuring 36 feet front by 44 feet depth. Each half has a parlor, dining room, and kitchen on the first floor, and three bedrooms on the second. The exterior was finished with sheathing, clapboarding, and shingle roof. The interior was finished in hardwood, varnished. The house was connected with the city water mains, and a sewer was provided. A brick oil house with an iron door, shelving, and roof was erected. Boat cranes were erected on the breakwater and the outer end of the north pier for the accommodation of the keeper's boat. The stairs leading from the outer end of the elevated walk to the lower room of the beacon were taken down, the lower entrance was enlarged and provided with a sliding door, and the whole was converted into a boathouse. Various repairs were made.

1540. Two Rivers Pierhead, Lake Michigan, Wisconsin.—A storage room for oil was provided.

1541. Twin River Point, Lake Michigan, Wisconsin.—The removal of the old tower and the addition to the keeper's dwelling were completed. The oil house was moved to a line with the iron tower.

1542, 1543. Kewaunee Pierhead Range, Lake Michigan, Wisconsin.—The conduit light was reestablished on October 17, 1895. Some 200 running feet of elevated conduit was built. Various repairs were made.

This station, which consists at present of range lights and a steam fog signal, has no dwelling for the keepers. It is estimated that proper structures can be erected for $7,500, and it is recommended that an appropriation of this amount be made therefor.

1551, 1552. Bailey Harbor Range, Lake Michigan, Wisconsin.—A brick oil house was built with an iron roof shelving, and doors, and a concrete floor. A sidewalk 1,071 running feet long was laid through the swamp between the front and rear ranges, and 120 running feet of sidewalk was built between the oil house and dwelling.

Ninth District.

1555, 1556. Plum Island Range, Lake Michigan, Wisconsin.—Plans, specifications, and estimates for establishing range lights and fog-signal station were made. Bids for the metal work of the tower for the rear light were opened December 5, and a contract was made. Plans were made for the fog-signal house, oil house, boathouse, and men's quarters or permanent outbuilding, and for duplicate fog-signal boilers and machinery. Bids were invited for the erection of a keeper's dwelling and fog-signal house. A bid for furnishing the metal work for an oil house was accepted. Bids were obtained for furnishing duplicate fog-signal boilers and machinery for this station, and a contract was made. Material was ordered for the construction of this station. The station is to be completed this fall.

—. *Fishermans Shoal, Lake Michigan, Wisconsin.*—This shoal rock, which is near Rock Island, forms a dangerous obstruction to the increasing number of vessels passing in this vicinity. It is proposed to establish a light and fog signal on this shoal in the interest of this commerce. It is estimated that it can be done for $50,000, and it is recommended that an appropriation of this amount be made therefor.

1559. Seul Choix Pointe, Lake Michigan, Michigan.—This light was changed from a fourth-order to third-order fixed white on August 15, 1895. This station was completed in September, 1895. The fog signal was established on September 10, 1895.

1564. Squaw Point, Green Bay, Michigan.—Negotiations relative to obtaining title to the site were begun. An offer was accepted to sell 1 acre for a site for $750. The deed was given, accepted, and recorded. Steps will be taken at an early date for the construction of this station.

1570. Menominee Pierhead, Green Bay, Michigan.—The sundry civil appropriation act approved June 11, 1896, provided $5,000 for the establishment of a steam fog signal at this station. Plans and specifications for duplicate fog-signal boilers and machinery were made.

1575. Tail Point, Green Bay, Wisconsin.—The following recommendation made in the Board's annual report for 1894 is renewed:

> The fog bell at this station is of little or no benefit in its present location, it being so far from the channel that it can be heard only in the stillest weather, and not then if the wind is from the northward or eastward. Interested navigators urge that not only should the bell be moved, but also that the light should be moved to the spot now marked by the red can buoy, which is S. by E. ¼ E. 1,650 yards distant from the present light. A crib of sufficient size can be built in say 10 feet of water, and the present light-keeper's dwelling and tower can be moved to it, and the fog bell established on it at a cost which is estimated to be not exceeding $7,500. It is therefore recommended that an appropriation of this amount be made therefor.

1576, 1577. Grassy Island Range, Green Bay, Wisconsin.—The old kitchen of the keeper's dwelling was torn down, and a new one was erected. The boathouse was finished and a landing crib and boat ways were built. Some 330 running feet of sidewalk were laid. Various repairs were made.

Ninth District.

—. *Menasha, Green Bay, Wisconsin.*—The following recommendation, which was made in the Board's last six annual reports, is renewed:

> It is now difficult to make the Menasha River at night on account of the cut through the rock and the earth cut, which is found to be quite intricate. To meet this difficulty it is proposed to establish here two range lights, one to be placed on the site of the old Menasha light, which was discontinued under the operations of the act of March 3, 1859, which site is still Government property; the other to be placed on the northeast end of Doty Island, adjacent to the channel which was dredged out in 1887.
>
> It is estimated that these range lights can be established for a sum not to exceed $500, and it is recommended that an appropriation of this amount be made therefor

REPAIRS.

During the fiscal year repairs more or less extensive were made at each of the following-named stations:

1470. Old Mackinac Point, Mich.
1477. Skilligallee, Mich.
1481. Charlevoix Pierhead, Mich.
1487. Point Betsey, Mich.
1488. Frankfort Pierhead, Mich.
1489. Portage Lake Pierhead Range, Mich.
1491. Manistee Pierhead, Mich.
1492. Manistee, Mich.
1495, 1496. Ludington Pierhead Range, Mich.
1497, 1498, ———, Pentwater Pierhead Range, Mich.
1501. White River, Mich.
1502, 1503. Muskegon Pierhead Range, Mich.
1508, 1509. Holland Pierhead Range, Mich.
1512. South Haven Pierhead, Mich.
1513, 1514. St. Joseph Pierhead Range, Mich.
1515. St. Joseph, Mich.
1520, 1521. Chicago Pierhead Range, Ill.
1522. Chicago Harbor, Ill.
1524. Grossepoint, Ill.
1527, 1528. Kenosha Pierhead Range, Wis.
1530. Racine, Wis.
1531. Wind Point, Wis.
1533. Milwaukee, Wis.
1534. Port Washington Pierhead, Wis.
1535. Port Washington, Wis.
1537. Sheboygan, Wis.
1544, 1545. Ahnapee Pierhead Range, Wis.
1547. Sturgeon Bay Canal, Wis.
1553. Cana Island, Wis.
1554. Porte des Morts, Wis.
1557. Pottawatomie, Wis.
1560. Squaw Island, Mich.
1563. Escanaba, Mich.
1569. Chambers Island, Wis.
1572. Sherwood Point, Wis.
1573, 1574. Dunlap Reef Range, Wis.

LIGHT-VESSELS.

1473. Simmons Reef light-vessel, No. 55, Straits of Mackinac, Lake Michigan, Michigan.—This vessel left her station on December 12, 1895, and went to Cheboygan, Mich., for the winter. During the closed season she was ironed fore and aft at the water line, new and more effective limber chains were put in, repairs were made to the steam fog whistle, and the characteristic of the latter was changed to sound blasts of 5 seconds' duration, separated by silent intervals of 55 seconds. She returned to her station on April 21, 1896.

1474. White Shoal light-vessel, No. 56, Straits of Mackinac, Lake Michigan, Michigan.—This vessel left her station on December 12, 1895, and went to Cheboygan, Mich., for the winter. During the closed season she was ironed for and aft at the water line and new and more effective limber chains were put in. She returned to her station on April 20, 1896. She was supplied with a new boat.

1475. Grays Reef light-vessel, No. 57, Straits of Mackinac, Lake Michigan, Michigan.—This vessel left her station on December 12, 1895, and went to Cheboygan, Mich., for the winter. During the closed season she was ironed fore and aft at the water line and new and more effective limber chains were put in. The characteristic of her steam fog whistle was changed to sound two blasts of 1 second each, followed by a silent interval of 20 seconds, and one blast of 3 seconds, followed by a silent interval of 15 seconds. She was furnished with a new boat during the year. She returned to her station on April 20, 1896.

1562. Eleven-Foot Shoal light-vessel, No. 60, about midway between Eleven-Foot Shoal and Corona Shoal, Green Bay, Lake Michigan, Michigan.—This vessel left her station on December 8, 1895, and was towed into Escanaba, Mich., where she remained for the winter. She was returned to her station on April 20, 1896.

Each of the above-named vessels was supplied with fuel for fog signals while in winter quarters.

FOG SIGNALS OPERATED BY STEM OR HOT-AIR ENGINES.

1470. Old Mackinac Point, Michigan.—The 10-inch steam whistle, in duplicate, was in operation some 669 hours, and consumed about 65 cords of wood.

1473. Simmons Reef light-ship, No. 55, Michigan.—The 6-inch steam whistle was in operation some 368 hours, and consumed about 20 tons of coal and 3½ cords of wood.

1474. White Shoal light-ship, No. 56, Michigan.—The 6-inch steam whistle was in operation some 371 hours, and consumed about 17 tons of coal and 2½ cords of wood.

1475. Grays Reef light-ship, No. 57, Michigan.—The 6-inch steam whistle was in operation some 353 hours, and consumed about 14 tons of coal and about 2 cords of wood.

1476. Waugoshance, Michigan.—The 10-inch steam whistle, in duplicate, was in operation some 320 hours, and consumed about 21 tons of coal and one-half of a cord of wood.

1477. Skilligallee Michigan.—The 10-inch steam whistle, in duplicate was in operation some 273 hours, and consumed about 15 tons of coa and 16 cords of wood.

1479. Beaver Island, Michigan.—The first-class steam sirens, in duplicate, were in operation some 374 hours, and consumed about 18 cords of wood.

1482. South Fox Island, Michigan.—The 10-inch steam whistle, in duplicate, established December 10, 1895, was in operation some 14 hours, and consumed about 15 tons of coal.

Ninth District.

1486. South Manitou, Michigan.—The 10-inch steam whistle, in duplicate, was in operation some 703 hours, and consumed about 58 cords of wood.

1487. Point Betsey, Michigan.—The 10-inch steam whistle, in duplicate, was in operation some 750 hours, and consumed about 70 cords of wood.

1491. Manistee Pierhead, Michigan.—The 10-inch steam whistle, in duplicate, was in operation some 573 hours, and consumed about 51 tons of coal and 3 cords of wood.

1496. Ludington Pierhead, Ludington, Michigan.—The 10-inch steam whistle was in operation some 607 hours, and consumed about 71 tons of coal and 5 cords of wood.

1506. Grand Haven Pierhead, Michigan.—The first-class steam siren, in duplicate, was in operation some 410 hours, and consumed about 31 tons of coal and one-fourth of a cord of wood.

1522. Chicago Harbor, Illinois.—The 10-inch steam whistle, in duplicate, was in operation some 324 hours, and consumed about 42½ tons of coal and 7½ cords of wood.

1524. Grossepoint, Illinois.—The 10-inch steam whistle, in duplicate, was in operation some 256 hours, and consumed about 25 tons of coal and 1½ cords of wood.

1531. Wind Point, Wisconsin.—The 10-inch steam whistle, in duplicate, was in operation some 774 hours, and consumed about 53½ tons of coal and 3 cords of wood.

1532. Milwaukee Pierhead, Wisconsin.—The 10 inch steam whistle, in duplicate, was in operation some 782 hours, and consumed about 29 tons of coal and 1 cord of wood.

1536. Sheboygan Pierhead, Wisconsin.—The 10-inch steam whistle, in duplicate, established March 20, 1896, was in operation some 155 hours, and consumed about 13 tons of coal and one-half of a cord of wood.

1538. Manitowoc Breakwater, Wisconsin.—The 10-inch steam whistle, in duplicate, established November 28, 1895, was in operation some 305½ hours, and consumed about 25 tons of coal and 3½ cords of wood.

1541. Twin River Point, Wisconsin.—The 10-inch steam whistle, in duplicate, was in operation some 460 hours, and consumed about 38 tons of coal and 7½ cords of wood.

1543. Kewaunee Pierhead, Wisconsin.—The 10-inch steam whistle was in operation some 608 hours, and consumed about 57 tons of coal and 4 cords of wood.

1546. Sturgeon Bay Canal Pierhead, Wisconsin.—The 10-inch steam whistle, in duplicate, was in operation some 630 hours, and consumed about 67 tons of coal and 5 cords of wood.

1554. Porte des Morts, Wisconsin.—The 10-inch steam whistle, in duplicate, was in operation some 349 hours, and consumed about 4 tons of coal and 30½ cords of wood.

Ninth District.

1558. Poverty Island, Michigan.—The 10-inch steam whistle, in duplicate, was in operation some 244 hours, and consumed about 37 cords of wood.

1559. Seul Choix Pointe, Michigan.—The 10-inch steam whistle, in duplicate, established September 10, 1895, was in operation some 202 hours, and consumed about 24 tons of coal.

1560. Squaw Island, Michigan.—The 10-inch steam whistle, in duplicate, was in operation some 328 hours, and consumed about 22 tons of coal.

1562. Eleven-Foot Shoal light-vessel, No. 60, Michigan.—The 6-inch steam whistle was in operation some 268 hours, and consumed about 16 tons of coal and 1½ cords of wood.

BUOYAGE.

The buoyage is in good condition.

The following changes in buoys were made during the year:

Randolph Street Viaduct Buoy.—This buoy, a red and black horizontal striped spar, in 10 feet of water inside of the new bulkhead for the Lake Front Park, was discontinued December 10, 1895.

Outer Shoal Buoy, entrance to Porte des Morts Passage, Lake Michigan.—An automatic bell buoy, painted red, was substituted at the same moorings for the red second-class nun buoy formerly marking Outer Shoal, on June 3, 1896.

Boulder Reef Buoy, Lake Michigan.—A 25-foot spar buoy, red and black horizontal stripes, in 19 feet of water, near the northwest end of Boulder Reef, northern part of Lake Michigan, was established August 13, 1895.

Saunders Point Buoy, Little Bay de Noquette, Michigan.—This buoy, black, was changed from a third-class can to a 25-foot spar, same color, November 22, 1895.

Monument Shoal Buoy, Green Bay, Wisconsin.—This buoy, a 25-foot spar, black, in 18 feet of water, to mark the most westerly point of the shoals off Monument Point, Wisconsin, was established August 20, 1895

Entrance buoy, straight channel, No. 1, Green Bay, Wisconsin.—This buoy, a second-class nun, black, in 17½ feet of water, at the entrance to the new straight cut leading to the mouth of Fox River, was established May 1, 1896. Three black spar buoys were also placed on May 1 on the east side of the new channel, between the above new buoy and the point where dredging for the straight channel begins.

The iron buoys were taken up for the winter and replaced by spar buoys, similarly painted, between November 15 and 30, 1895. The iron buoys were replaced in April, 1896.

DEPOTS.

St. Joseph, Mich.—The supplies and stores from the general depot were received and issued from this depot. Stores obtained by open purchase were also sent here to be packed for distribution.

Ninth District.

During the year a derrick was erected on the water front, a buoy shed, and platforms for buoys, anchors and chains were completed, and a windmill and tank to supply the station with water were put in, and the station is now practically completed. A contract was made for furnishing the material and labor for the construction of a buoy shed, platform, tramway, and derrick at this depot. The work was completed in November.

Light-house depot for the Ninth and Eleventh light-house districts.—The recommendation made in the Board's last four annual reports for the establishment of a depot for the Ninth and Eleventh districts in the vicinity of the Straits of Mackinac is renewed.

With the multiplication of the aids to navigation in the vicinity of the Straits of Mackinac it is evident that the construction of a buoy depot for the common use of both the Ninth and Eleventh districts will be of great value to the Light-House Service. It is estimated that this depot can be established for not exceeding $15,000, and it is recommended that an appropriation of this amount be made therefor.

TENDERS.

The Dahlia.—This iron screw steamer was employed during the summer and fall of 1895 in supplying fog signals and light-vessels with fuel and in the inspection of stations and attendance on the buoyage of the district. She returned to Chicago on December 4, 1895, after taking up the iron buoys for the winter. Her crew was discharged on December 31. During the winter her decks were calked and the upper deck was re-covered with canvas. A new foremast was put in and extensive repairs were made to the engine. On the opening of navigation a crew was employed and the iron buoys were replaced. Since then she has been engaged in inspection and supply trips and in attendance on the buoys. She steamed 9,425 miles, and consumed 507 gross tons of coal.

The Amaranth.—This steel screw steamer was employed during the season of 1895 in delivering materials for construction and repairs at South Fox Island, Manitowoc, Twin River Point and Bailey Harbor Range, South Manitou, Sheboygan Pierhead light-stations, and at the lighthouse depot, St. Joseph, Mich., and in returning materials from Grand Haven Pierhead light-station, on inspection duty, and in returning materials and camp outfit from Seul Choix Point light-station. She was laid up for the winter at the Detroit light-house depot in November. She delivered 330 tons of material and steamed some 2,540 miles, consuming about 125 tons of coal.

The Warrington.—This steam screw barge was loaded at the Detroit light-house depot in April with materials for repairs at Waugoshance light-station, Michigan. The hull and machinery were repaired. She was employed on the work at Waugoshance continuously during May and June.

TENTH DISTRICT.

This district extends from the mouth of the St. Regis River, S Lawrence River, New York, to the mouth of the River Rouge, Detro River, Michigan. It embraces all aids to navigation on the Unit States shores and waters of Lakes Erie and Ontario and the upper pa of the St. Lawrence, the Niagara, and the lower part of the Detro rivers.

Inspector.—Commander Charles V. Gridley, United States Navy.

Engineer.—Lieut. Col. Jared A. Smith, Corps of Engineers, Unit States Army.

In this district there are—

Light-houses and beacon lights	[illegible]
Light-vessels in position	[illegible]
Fog signals operated by steam	[illegible]
Fog signals operated by clockwork	[illegible]
Lighted buoys in position (gas 2, oil 1)	[illegible]
Buoys in position	1[illegible]
Steamer *Haze*, buoy tender, and for supply and inspection	[illegible]

LIGHT-STATIONS.

—. *Oak Point, St. Lawrence River, New York.*—Range lights a needed to guide vessels clear of the rocky shoals near the main chann of the river at Oak Point, between Ogdensburg light and Cross Ov Island light. It is estimated that these can be established for $10,00 and it is recommended that an appropriation of this amount be ma therefor.

1185. Cross Over Island, St. Lawrence River, New York.—A wood 70-barrel cistern was built in the cellar of the keeper's dwelling replace the brick cistern. The old ice house and the boat ways we rebuilt. Various repairs were made.

1186. Sister Islands, St. Lawrence River, New York.—The superstru ture of the wharf was rebuilt. The old boathouse was rebuilt a enlarged to include not only room for the keeper's boat, but coal a wood, stores and supplies, and a workshop. Minor repairs were ma

—. *Carlton Island, St. Lawrence River, New York.*—By act of Co gress approved June 11, 1896, an appropriation of $6,000 was made f the establishment of a light-station on or near this island. Necessa action to establish the station will be taken at an early date.

—. *Chapman Shoal, St. Lawrence River, New York.*—This shoal is solid rock, the top of which is awash at ordinary stages of water.

Tenth District.

stands in mid-channel between Beckwith Island and North Colborne Island, and forms a dangerous obstruction. It is proposed to establish here a light and fog-signal station. It is estimated that this can be done for $25,000, and it is recommended that an appropriation of this amount be made therefor.

1189. Tibbetts Point, St. Lawrence River, New York.—Under the appropriation made by the act approved on March 2, 1895, a brick fog-signal house was erected. Bids for furnishing a duplicate steam signal apparatus were opened June 15, 1896, but they were all rejected, as the lowest and only one within the limits of the funds available for the purpose did not conform to the specifications. Bids were again asked, and the lowest was accepted subject to modifications to make it conform to the specifications.

1191. Galloo Island, Lake Ontario, New York.—The dwelling was thoroughly repaired. One of the small outbuildings was rebuilt and enlarged. A foundation for an iron oil house was built and the landing wharf was repaired. The metal work for an oil house was constructed ready for erection on the prepared foundation. Various repairs were made. By act of Congress approved June 11, 1896, $5,700 was appropriated for establishing a steam fog signal at this station.

1192. Stony Point, Lake Ontario, New York.—Extensive repairs were made to the keeper's dwelling. A concrete foundation for an oil house was built, and the metal work for the oil house was purchased. Various repairs were made.

1195, 1196. Fair Haven, entrance to Little Sodus Bay, Lake Ontario, New York.—The inner light of the range on the west pier was formerly supported upon an open framework, which left the lens lantern exposed. This was replaced by a substantial wooden beacon, with lantern to protect the lens, and with a room for trimming the light and storing the supplies. Minor repairs were made.

1197–1199. Big Sodus, at Sodus Point, Lake Ontario, New York.—In the previous year extensive modifications and repairs were made to the keeper's dwelling, and a substantial and commodious beacon with a lantern, closets, and storage room was built to replace the old one, which was unserviceable. This is mentioned here, as it was omitted in the Board's last annual report.

1200, 1201. Genesee, Charlotte Harbor, Lake Ontario, New York.—The outer pierhead beacon was moved nearly 500 feet to the outer end of the new extension to the west pier. The fog signal, which occupied the old light-house crib on the west side of the west pier, at the mouth of the Genesee River, was moved about 1,000 feet to a position near the end of this pier. About 576 feet of elevated walk, taken down for the removal of the fog signal, was replaced, and the old walk was extended to the new fog-signal house and beacon. About 70 running feet of division fence near the keeper's dwelling was rebuilt. The lease under which a part of the light-house premises has been occupied by the Rochester Electric Railway Company of Rochester, N. Y., expired January 30, 1896. The company not having removed their property from the premises at the expiration of their lease, in accordance with its terms, a suit at law has been begun to compel the company to vacate the premises.

1202. Braddock Point, Lake Ontario, New York.—The keeper's dwelling, tower, and woodshed were completed. A brick barn being built is to be completed in August, 1896. Metal work for an iron oil house was furnished by contract. The grounds were graded and sodded and walks and driveways were made. A fence was built on the south boundary line and along the public highway on the west or front of the lot, and a 5⅝-inch well was drilled 105 feet (93 feet in solid rock). The three and one-half order lens recently used at the Cleveland (Ohio) main light-station, now discontinued, was placed in the tower lantern. The station will be ready for lighting by the middle of August, 1896.

1203. Oak Orchard, entrance to Oak Orchard Harbor, Lake Ontario, New York.—The old wooden walks leading from the front and rear porches were replaced with concrete. The repairs to the dwelling left unfinished at the close of the last fiscal year were completed.

1204. Thirty-Mile Point, east of Niagara, Lake Ontario, New York.—The oil house was moved to a new site and placed on a concrete foundation. Various repairs were made.

1206. Fort Niagara, Niagara River, Lake Ontario, New York.—The keeper's old dwelling is to be rebuilt under a contract by October 15, 1896. Minor repairs were made.

1207, 1208. Niagara River Range, Niagara River, New York.—The rear beacon of this range is on a site belonging to the city of Buffalo. It is unsuitable and unsightly and is to be replaced with a better beacon, inclosed by an iron fence.

1212. Dunkirk, Dunkirk Harbor, Lake Erie, New York.—The old wooden bridge on the lake front near the keeper's dwelling was replaced with earth filling retained by a substantial stone wall. The work was done by the city of Dunkirk, which maintains a driveway across the light house premises. The station was connected with the waterworks of the city of Dunkirk by laying 976 feet of 2½-inch iron pipe. Various repairs were made.

1213. Dunkirk Pierhead, entrance to Dunkirk Harbor, Lake Erie, New York.—On August 15, 1895, the color of this light was changed from white to red. During a severe storm on December 31, 1895, the foundation crib of this beacon was wrecked and the beacon carried away. A temporary wooden beacon was erected on the east end of the west breakwater, a few feet from the site of the old beacon, from which the light was exhibited since the opening of navigation in 1896. A new foundation pier is to be built during the ensuing year. The assistant keeper's dwelling, which is very old, is to be rebuilt.

Tenth District.

1214. Erie, outside of Erie Harbor, Presqu'ile Bay, Lake Erie, Pennsylvania.—The house was thoroughly repaired throughout and the back porch was enlarged. Some 170 running feet of plank walk about the dwelling was rebuilt. Various minor repairs were made.

1215. Presqu'ile Pierhead, Erie Harbor, entrance to Presqu'ile Bay, Lake Erie, Pennsylvania.—The woodshed was rebuilt and enlarged. A walk 90 feet long about the keeper's dwelling was rebuilt.

1216. Erie Range, No. 1, entrance to Presqu'ile Bay, Lake Erie, Pennsylvania.—This beacon was rebuilt and improved in plan. It is now entirely inclosed and surmounted by an octagonal lantern surrounded by a balcony with hand rail, and the interior is fitted with closets and shelves for keeping lamps and supplies.

1219. Presqu'ile, entrance to Erie Harbor, Presqu'ile Bay, Pennsylvania.—Repairs were made to the dwelling. A drain 130 feet long was dug and laid with 4-inch tile. A well was dug 8 feet deep, connected by pipes with the kitchen and provided with a pump. An old outbuilding was rebuilt and enlarged. The barn was rebuilt on a larger plan. About 6,000 feet of the walk leading from the dwelling to the boathouse was widened to 2 feet, elevated, and leveled. A new foundation for the boathouse was built in 4 feet of water and the boathouse was repaired and placed on it.

1220. Conneaut Pierhead, entrance to Conneaut Harbor, Lake Erie, Ohio.—A new inclosed square, white beacon, surmounted by an octagonal copper-roofed lantern, with balcony and railing, was built at the outer end of the west pier. Its focal plane was changed from 20 to 30 feet above mean lake level. On September 8, 1895, the light was first shown from the new beacon.

1221. Conneaut, Lake Erie, Ohio.—About 150 feet of 5-inch earthen pipe was laid to connect with the public sewer. A small outbuilding was rebuilt and the barn was rebuilt and enlarged. The old beacon will be replaced on the pier with a new one to form a rear beacon for the range.

1222. Ashtabula, entrance to Ashtabula Harbor, Lake Erie, Ohio.—The woodshed was rebuilt and enlarged. On November 1, 1895, a skeleton iron framework constituting the rear beacon of the range was struck by the boom of a dredge working in the vicinity, impairing it so that it fell on the next day. This type of tower is unsatisfactory. A temporary wooden tower was erected to remain until a permanent beacon of suitable type can be built.

—. *Cleveland, on the hill at the east side of Cleveland Harbor, Ohio.*—The lantern, iron stairway, iron window frames and sash, finished stone of the upper part of the tower, and the lens were removed from this discontinued light-station and transferred to the Braddock Point (New York) light-station for use in the establishment of that light. The remaining part of the tower was roofed and the window openings were boarded up. Damage was done to the grounds about the keeper's dwelling, necessitating considerable work upon them, such as regrading and seeding. The fence inside of the curb along the front of the lot was damaged by fires in the vicinity and the fence in the rear of the dwelling was thoroughly repaired. Iron pipes were put in to replace broken earthen pipes leading water from down-spouts of the dwelling to the sewer. The light at this station was discontinued on September 15, 1893.

1228. Cleveland West Breakwater, entrance to Cleveland Harbor, Lake Erie, Ohio.—Some 130 cords of riprap stone were delivered around the crib on which the beacon and fog-signal house stand. Little vibration is now noticed during the most severe storms. The fog-signal apparatus was repaired. On July 19, 1895, the smokestack of the boiler was blown away, and a new stack was purchased to replace it. The platform on the east space between the crib and the pile-protection work was rebuilt to facilitate the handling of coal. The characteristic of the signal was changed July 1, 1895, by lessening the number of its blasts. The fog-signal house was modified, and a circular concave sound reflector, with the whistle bell in the center, was built to lessen the volume of the sound in the direction of the shore. It proved effective as a deflector and added to the distinctness of the sound upon the water.

1229. Cleveland East Pier, entrance to Cleveland Harbor, Lake Erie, Ohio.—A ladder for the use of the keeper was built on the east face of the pier. The beacon having settled and tipped to one side, was repaired.

1231, 1232. Black River Pierhead range lights, Lake Erie, Ohio.—The slight damage done to the elevated walk by a vessel in June, 1895, was repaired and the cost paid by the vessel's agent. On August 16, 1895, the upper part of the rear beacon was completely wrecked and the three lens lanterns were badly shattered by the collision of a vessel being towed out of the harbor. That beacon was rebuilt and relighted on August 24. The damaged lanterns were replaced with new lens lanterns some two months later. The owners of the boat having the vessel in tow which inflicted the damage paid part of the expense.

1234. Huron, entrance to Huron Harbor, Ohio.—An old outbuilding was made into a fuel house. The boundary fence of the lot occupied by the keeper's dwelling was rebuilt for 533 feet and repaired for 265 feet. The plank walks were rebuilt. Various repairs were made.

1235, 1236. Cedar Point, entrance to Sandusky Bay, Lake Erie, Ohio.—Various repairs were made to the keeper's dwelling. The wharf was repaired and extended 106 feet. The extension is 20 feet wide and rests on heavy oak piling. A contract was made for building a further extension of this wharf of the same type 256 feet long into about 10 feet depth of water. A steel car and 800 feet of steel rails were purchased and delivered at this station for use on the completed wharf, which is to be used in transferring buoys, etc., from the light-house tender to the shore.

1237, 1238. Sandusky Bay Range, on the bar, entrance to Sandusky Bay, Lake Erie, Ohio.—Congress, by act approved August 18, 1894, appropriated $25,000 for the moving and rebuilding of these range lights and the keeper's dwelling. The structures consist of a keeper's dwelling and the tower, which is the front beacon, on cribs 50 and 40 feet square, respectively, and about 1,500 feet apart. The station was completed sufficiently to be occupied and lighted. The lights were exhibited on the opening of navigation in 1896. The cribs were surrounded with brush mattresses weighted with stone. It was thought best to place additional mattresses and stone to cover a wider distance from the cribs. This work is to be done by contract, and will be completed in the ensuing summer.

—. *Sandusky Bay ranges, on the outer bank at the elbow of the dredged channel, Sandusky Bay, Ohio.*—The lights of these ranges were discontinued on the establishment of the Sandusky Bay Range (straight channel) light-station, Ohio.

—. *Sandusky Bay light-station, Ohio.*—By the act approved June 11, 1896, $30,000 was appropriated for establishing two range lights in Sandusky Bay, Ohio. Work upon these lights will be begun as soon as practicable.

1240. South Bass Island, Lake Erie, Ohio.—A contract is being made for building the structures, consisting of a brick dwelling, tower, and woodshed. The metal work for a fireproof oil house was furnished under contract.

1241. Green Island, on the west end of Green Island, Lake Erie, Ohio.—A carriage and iron track were provided to take the keeper's large boat from the water. Minor repairs were made.

1242. Port Clinton, entrance to Port Clinton Harbor, Lake Erie, Ohio.—This light, which was discontinued some 26 years, has been reestablished. A pyramidal beacon, square in plan, surmounted by an octagonal lantern, surrounded by a balcony with hand rail, was erected upon piles over the west pier and near its outer end. The illuminating apparatus consists of a 180-degree lens lantern, with ruby chimneys to give the red light.

1243. West Sister, on West Sister Island, Lake Erie, Ohio.—The corners of the new wharf extension were fitted with wrought-iron plates to protect them against ice. The boathouse was moved some 250 feet, and located on the old part of the wharf near the shore, and new boat ways were built with marine way truck.

1246–1248. Maumee Bay Ranges, Lake Erie, Ohio.—Some 500 cords of riprap stone were placed around the main crib and among the piles supporting the boathouse and wharf. A new cistern pump was provided. An appropriation of $20,000 was made by the act approved March 2, 1895, for establishing a new beacon at each end of the range, to form a range both outward and inward in the line of the channel in Maumee Bay. The plans and specifications for the work are being prepared by the district engineer. They had not been completed at the close of the fiscal year.

1249, 1250. Manhattan Range, Maumee Bay, Lake Erie, Ohio.—Stone was purchased for building a wall along the river. A small stone wall was built in the rear of the boathouse. Stones were set marking the boundaries of the lot occupied by the dwelling. The lot was graded, sodded, and fenced between the street and the bluff, in the rear of the dwelling. The house drain was extended about 150 feet into the river. A driveway and walks were built and a well furnishing a good supply of good water was drilled 285 feet deep. About 40 cords of stone were placed about the front beacon pile foundation. Minor repairs were made.

—. *Maumee Outer, Maumee Bay, Lake Erie, Ohio.*—A section of the boundary fence was reerected where blown over. A custodian was appointed to care for the premises.

—. *Maumee Middle, Maumee Bay, Lake Erie, Ohio.*—The custodian resigned. No successor has been appointed.

—. *Maumee Inner, Maumee Bay, Lake Erie, Ohio.*—The premises are occupied by a custodian.

1257, 1258. Grosse Isle (north channel) Range lights, Detroit River, Michigan.—The following recommendation was made in the Board's last two annual reports:

> The site was paid for and the beacons were completed, but funds have not permitted the erection of a dwelling. The beacons are situated near the north end of the island, where the houses are almost exclusively owned and occupied by summer residents, and there is no place where a keeper can live within a reasonable distance. The construction of a dwelling is therefore essential to the proper maintenance of the lights. A suitable dwelling may be constructed for $3,500, and an appropriation of that amount is recommended for that purpose.

1259, 1260. Grosse Isle (south channel) Range lights, Detroit River, Michigan.—The following recommendation was made in the Board's last three annual reports:

> A new dwelling is needed for the keeper of this range. He is now living in a dwelling on Mamajuda, which is not only unsuitable for the purpose but is too far away. It is deemed dangerous for the keeper to live on the side of the channel opposite to the lights. A proper dwelling can be built on a foundation partially in the water for not exceeding $5,000, and it is recommended that this amount be appropriated for that purpose.

1261, 1262. Mamajuda Island Range light, Detroit River, Michigan.—A storm house was built over the west door. Some 200 feet of 2-inch galvanized-iron pipe was laid in the river.

1263. Grassy Island (south channel) Range, Detroit River, Michigan.—By act approved March 2, 1895, $6,700 was appropriated for the completion of the lighting of the north and south ends of Grassy Island. A beacon was built about 1,300 feet south of Grassy Island main light on the island known as Grassy Island Fishery, and a light was established in it to form with the Grassy Island main light a range south for running the main channel of Detroit River between Grosse Isle north channel and the Mamajuda Island range lines. The beacon is square in plan, pyramidal, surmounted by a copper-roofed lantern, surrounded by a gallery with hand rail. The light is exhibited from a 90-degree lens lantern. The focal plane of the light is 25 feet high. Several old buildings useless to the light-station were torn down.

1264. *Grassy Island, on Grassy Island Shoal, Detroit River, Michigan.*—This light not only indicates the position of the elbow of Grassy Island Shoal, but serves also as a rear light for the Grassy Island (south channel) Range. The gallery deck of the tower lantern was repaired, and earth was placed about the dwelling to fill the depressions caused by the settlement of earth deposited the year before.

1265, 1266. *Grassy Island (north channel) Range, Detroit River, Michigan.*—Plans and specifications for the station buildings were completed and bids were asked for their construction. The lights are to be fixed white shown from lens lanterns.

1267, 1268. *Ecorse Range lights (Grassy Island), Detroit River, Michigan.*—These lights were first exhibited in September, 1895, from sixth-order lenses which had been transferred from the Maumee Middle Range discontinued light-station. A walk was built with a single hand rail between the two beacons. This walk was removed in the winter and replaced in the spring. Minor repairs were made. Space was engaged in a boathouse at Ecorse for the storage of the keeper's boat. The lights were last lighted for the season of 1895 on December 20, and they burned until their oil was consumed. Owing to the running ice the keeper was unable after that date to reach the lights to extinguish or to relight them. The care of these lights, especially during the latter part of the season, is attended with great difficulties and considerable danger from floating ice and logs.

The following statement made in the Board's last annual report is renewed:

> The lights of this range are located on the flats, in water about 3½ feet deep, in front of a wide marsh. The nearest place where a keeper could reside is in the village of Ecorse, about three-fourths of a mile distant in a direct line. If he should live there it would be necessary to row fully a mile. This would be quite difficult at times, as the ice forms and remains in the shallow water while the main channel is open. The light-house reservation, which is 100 feet wide and about 700 feet long, is entirely submerged, and the bottom is so soft that a secure foundation can be had only upon piles protected with riprap stone. It is indispensable to the proper care of this station that the keeper live on its site. This can be made possible only by the erection here of a keeper's dwelling. It is estimated that a suitable one can be erected for $5,000, and it is recommended that an appropriation of this amount be made therefor.

Tenth District.

REPAIRS.

At each of the following-named stations repairs more or less extensive were made during the year:

1184. Ogdensburg, N. Y.
1187. Sunken Rock, N. Y.
1189. Tibbetts Point, N. Y.
1190. Sacketts Harbor, N. Y.
1193. Oswego, N. Y.
1194. Oswego Breakwater, N. Y.
1209. Horseshoe Reef, N. Y.
1210. Buffalo Breakwater, N. Y.
1211. Buffalo, N. Y.
1217. Erie Range, No. 2, Pa.
1224. Fairport, Ohio.
1230. Cleveland West Pier, Ohio.
1233. Vermilion, Ohio.
1239. Marblehead, Ohio.
1244. Turtle Island, Ohio.
1251. Monroe, Mich.
1253. Detroit River (Bar Point), Ohio.
1257, 1258. Grosse Isle (north channel) Range, Mich.
1259, 1260. Grosse Isle (south channel) Range, Mich.

LIGHT-VESSELS.

1252. Bar Point light-vessel, No. 59, Lake Erie, Michigan.—This vessel was removed from her station on December 5, 1895, and placed in winter quarters at the Government dock in Detroit. She was replaced on her station April 6, 1896. She is in good condition.

1254. Limekiln Crossing light-vessel (south), No. 64, Detroit River, Michigan.—This vessel was removed from her station on December 6, 1895, and placed in winter quarters at Detroit. She was replaced on her station on April 7, 1896. This vessel was injured by collision in May last and was taken to Detroit, where she received extensive repairs. She was replaced during her absence by another vessel.

1255. Limekiln Crossing light-vessel (north), No. 65, Detroit River, Michigan.—On December 6, 1895, this vessel was removed from her station and was placed in winter quarters at Detroit. On April 7, 1896, she was replaced on her station. She is in good condition.

These two vessels (Limekiln Crossing north, and Limekiln Crossing south) mark a curved channel not very wide, with considerable current and a rocky bottom. All the commerce of the upper lakes which enters Lake Erie must pass these vessels, and they are frequently moved out of position and damaged by rafts or vessels in tow. In one or two cases the expense has been borne by the owners of the vessels doing the damage, while in other cases it has been necessary to proceed through the United States courts for reparation. Two cases of this kind are now pending. In many cases these accidents are due to carelessness, and until an example is made and payment for damages collected the displacement of the vessels will probably be frequent.

Light-vessel and two float lights for marking the new channel at Ballards Reef, above Limekiln Crossing, on the lower Detroit River.—For the safety of navigation additional aids are much needed in this channel. It is proposed to establish here a small light-vessel, similar to the one already on Ballards Reef, together with two small float lights, one north and the other south of the vessel. These are to take the place of the floats now maintained by the Lake Carriers' Association. These two floats and the light-vessel can be cared for by the crew of the vessel itself, which would consist of simply a keeper and a deck hand. It is estimated that a proper vessel and floats can be constructed and equipped for $1,500, and it is recommended that an appropriation of this amount be made therefor.

1256. Ballards Reef light-vessel, No. 63, Detroit River, Michigan.—On December 5, 1895, this vessel was removed from her station and placed in winter quarters at Detroit. On April 7, 1896, she was replaced on her station. She is in good condition.

FOG SIGNALS OPERATED BY STEAM OR HOT AIR.

1200. Genesee, Lake Ontario, New York.—This 6-inch steam whistle was in operation some 93 hours, and consumed about 6 tons of coal.

1210. Buffalo Breakwater (north end), Lake Erie, New York.—This 10-inch steam whistle was in operation some 425 hours, and consumed about 32 tons of coal. The reflector which was designed to divert the sound from the city and toward the lake is finished and gives satisfaction.

1222. Ashtabula, Lake Erie, Ohio.—This 6-inch steam whistle was in operation some 89 hours, and consumed about 5 tons of coal.

1228. Cleveland West Breakwater (east end), Lake Erie, Ohio.—This 10-inch steam whistle was in operation some 766 hours, and consumed about 40 tons of coal. A sound reflector similar to the one at the Buffalo Breakwater light-station is finished and gives satisfaction.

1252. Bar Point light-vessel, No. 59, Lake Erie, Michigan.—This 6-inch steam whistle was in operation some 97 hours, and consumed about 4 tons of coal.

1253. Detroit River (Bar Point), Lake Erie, Michigan.—This 10-inch steam whistle was in operation some 189 hours, and consumed about 12 tons of coal.

The three fog bells of the district are in good condition and the machinery which operates them works well.

BUOYAGE.

The buoyage is in good condition. The tender *Haze* cared for the buoys in Lake Erie and Detroit River and placed those in Niagara River. The six unlisted dock channel buoys at Sandusky were all displaced or carried away soon after being placed, and as it was the third time this had happened they were not replaced. A buoy was established on Broadway Shoal, Alexandria Bay, New York, and Elbow buoy, in Niagara River, was reestablished. Nice Shoal buoy, Niagara River, New York, was discontinued. Gas buoys were substituted for buoy No. 8, Erie Harbor, Pennsylvania, and for buoy No. 1, at the entrance to Maumee Bay Straight Channel from the lake.

Tenth District.

DEPOTS.

Rock Island, St. Lawrence River, New York.—This depot is in fair condition, but it must be enlarged if the buoyage of the St. Lawrence River is to be increased.

Buffalo, Lake Erie, New York.—The buoy shed is too small, very old, and in bad condition. The keeper's dwelling is just alongside of the slip constructed for the tender. The slip is filling up, and is in bad condition. A 10-ton derrick, provided with hand hoisting gear, was purchased and erected on the buoy dock for handling buoys and anchors. The platform and its supporting timbers inside the buoy dock were renewed, and a plank walk was built from the front gate to the tender's slip. This depot is very small and badly located. It is useless as a winter harbor for tenders and light-vessels, and it is at present necessary to lay these up at the Detroit depot. This is out of the limits of the Tenth district, and its limited accommodations are needed by the tenders and light-vessels of the Eleventh light-house district. Matters have recently been made more serious by the work of deepening the channel to Buffalo, which has caused a movement and settlement of the wharf and keeper's dwelling at the Buffalo depot, and may require its abandonment at an early day. Under these circumstances, the Board asks that it may be authorized to take the proper steps to sell the Buffalo light-house depot at auction, as required by law, and to use so much of the proceeds as may be necessary to enable it to acquire a proper site elsewhere, and erect upon it structures which will make it useful as a depot for the Tenth light-house district.

Maumee Bay, Lake Erie, Ohio.—The buoy shed is in fair condition.

Erie, Pa.—The depot at this place is simply a small shed with a platform bridging space between the shed and the channel pier. Four snubbing posts for the use of the light-house tender were set in the pier near the buoy house.

Sandusky (Cedar Point), Ohio.—The wharf was extended 106 feet, and a contract was approved for building another extension of 256 feet to deeper water. The buoy house is so small and old that it is of little value. A larger and more substantial building is needed. The district is in need of better facilities for landing and care of buoys, anchors, and supplies. In the last annual report it was stated that a buoy house instead of a buoy wharf was being built by contract.

TENDER.

The Haze.—Extensive repairs were made to this screw steamer during the winter at Detroit and during the spring at Buffalo. She is an old vessel, was built in 1876, and has a secondhand engine and but one boiler. She is too small for the district, which has probably doubled in number of lights and buoys since she was launched. She can carry but one gas buoy at a time in safety, as her hatches will not permit them to go below decks. Her quarters, both for officers and crew, are small, and she can carry supplies for but half the district at a time. During the year the *Haze* was employed in caring for the buoyage of Lake Erie and Detroit River, in painting and whitewashing the depot buildings, fences, buoy sheds, etc., in making inspection trips as often as practicable, and in supplying the stations. She also transported the lantern and lens for Braddock Point light-house, Lake Ontario, from Cleveland to that station. She was laid up at Detroit on December 20, 1895, and her crew, except the cook, steward, and one deck hand, was discharged. She was commissioned again on March 16, 1896, and left Detroit on the buoy trip and to place the light-vessels on April 6, 1896, and after completing that work and finishing repairs in Buffalo, began on May 27 the supply of the stations, finishing the supply on June 19, 1896. During the year she ran some 7,287 miles, and consumed about 309 tons of coal.

ELEVENTH DISTRICT.

This district extends from the mouth of the River Rouge, Detroi River, Michigan, to the westerly end of Lake Superior. It embrace all aids to navigation on the United States shores and waters of Lake St. Clair, Huron, and Superior, the upper part of the Detroit River the St. Clair and St. Marys rivers, and that part of the Straits of Macki nac lying to the eastward of a line drawn across the straits just to th eastward of Old Mackinac Point light-station, Michigan.

Inspector.—Commander William W. Mead, United States Navy, t May 1, 1896; since then Commander William M. Folger, United State Navy.

Engineer.—Maj. Milton B. Adams, Corps of Engineers, United State Army.

There are in the district—

Light-houses and beacon lights, including 18 post lights	19
Light-vessels in position	
Day or unlighted beacons	
Fog signals operated by steam	2
Fog signals operated by clockwork	
Bell buoys in position	
Other buoys in position	35
Steamer *Marigold*, buoy tender, and for supply and inspection	1
Steam barge *Warrington*, for construction and repair	1
Steamer *Amaranth*, for construction and repair	1
Steam launch *Lotus*, for construction and repair	1

LIGHT-STATIONS.

1272. Windmill Point, Lake St. Clair, Michigan.—The sidewalk were renewed and an extension was made 200 feet long to the highway. A drive well was sunk in the cellar and a pump was provided. Variou repairs were made.

1273. Grossepoint beacon, Lake St. Clair, Michigan.—The lights her were discontinued on May 10, 1896.

—. *Lake St. Clair Twenty-Foot Channel, Michigan.*—Three beaco lights were established May 10, 1896, on pile clusters on the east sid for the temporary lighting of this channel. They were built by th Lake Carriers' Association, and turned over to the charge of the Ligh House Establishment. The middle beacon was twice destroyed an twice rebuilt. It now consists of five piles 40 feet long, driven in 1 feet of water as near the old location as it was possible to get. Th

Eleventh District.

center pile stands 15 feet out of water and the four outside piles 10 feet out, and are consequently driven to the depth of 9 and 14 feet respectively. These piles are capped with timber, and a platform 6 feet square surrounds the center pile.

The recommendation made in the Board's last annual report is in effect renewed.

—. *Lake St. Clair lights, Michigan.*—The new 20-foot channel begins at a point 1½ miles ENE. of Windmill Point and runs NE. ¼ E. about 6⅜ miles, where the natural depth of water is something over 20 feet. This portion of the channel when completed is to be 800 feet wide, with a mean depth at low water of 20 feet.

The dredged channel again begins at a point 2¼ miles SW. ⅜ S. from the southern entrance to the ship canal, but decreases in width as the canal is approached. This upper stretch is now fairly marked by the St. Clair Flats Canal lights, but it is believed to be necessary to have additional lights at the southern entrance to this cut, as in thick weather vessels of extreme draft would have difficulty in finding it. It is estimated that this new dredged channel can be effectively lighted for not exceeding $20,000, and it is recommended that an appropriation of this amount be made therefor.

1277. St. Clair Flats Canal (lower), Lake St. Clair, Michigan.—Snubbing posts were provided by driving two 16-inch oak piles 26 feet long. Various repairs were made.

1278. St. Clair Flats Canal (upper), Lake St. Clair, Michigan.—Snubbing posts were provided by driving two 16-inch oak piles 26 feet long.

1279–1290. St. Clair River lights, Michigan.

1280. Lower Reach (middle, No. 2), St. Clair River, Michigan.—The walks were relaid on new sleepers.

1281. Lower Reach (upper, No. 3), St. Clair River, Michigan.—The pile cluster was repaired by driving three 16-inch oak piles 26 feet long.

1282. Southeast Bend (lower, No. 4), St. Clair River, Michigan.—Piles damaged by frost were redriven and 70 feet of walk was relaid.

1283. Southeast Bend (middle, No. 5), St. Clair River, Michigan.—The platform was renewed, the three extra piles driven last fall were chained to the cluster and piles were redriven and the walk relaid.

1284. Southeast Bend (upper, No 6), St. Clair River, Michigan.—A new platform for the lamp was built on top of new piles and a chain was wound twice around the new pile cluster and fastened with heavy iron staples, and the walk was changed from the old to the new pile cluster. The pile cluster was renewed by driving five 16-inch oak piles 26 feet long. Minor repairs were made.

1293. Fort Gratiot, Lake Huron, Michigan.—A 1½-inch pipe was laid from the city water main to the center of the grounds in front of the dwelling, a hydrant was provided at this point, and branches were laid to each side of the double dwelling and to each fog-signal house. Various repairs were made.

Eleventh District.

1296. Sand Beach Harbor of Refuge (north), main light, Lake Huron, Michigan.—The water-supply pipe was run through the side of the fog-signal building and extended into the lake for an additional supply of water for the fog signal, and minor repairs were made.

1302. Saginaw River Range (front), Lake Huron, Michigan.—The superstructure of the crib was rebuilt ten timbers high from low water. Minor repairs were made.

1303. Saginaw River Range (rear), Lake Huron, Michigan.—A plank walk 625 feet long was built from the rear to the front light. Various repairs were made.

1305. Tawas, Lake Huron, Michigan.—The timber platform around the house and tower was rebuilt. The work of extending the landing dock into deeper water was begun. Various repairs were made.

—. Middle Island, Lake Huron, Michigan.—A light and fog signal are now needed here both in order to make available the harbor of refuge behind Middle Island, the only one in the vicinity having sufficient depth of water for the modern deep-draft lake vessels, and to mark a turning point in the regular course of vessels bound up or down the coast. It is proposed to establish a light and fog-signal station on Middle Island. This it is estimated can be done for $25,000, and it is recommended that an appropriation of this amount be made therefor.

1313. Forty-Mile Point, Lake Huron, Michigan.—The title papers to the site were completed and the deed was duly recorded. An estimate of cost for the proposed light and fog signal at this point, plans of the tower and dwelling, and plans and specifications for duplicate fog-signal boilers and machinery, with contract to furnish them, were made. The metal work for an oil house was delivered at the light-house depot. Contracts were made for furnishing the metal work required for building this station. The station is to be completed this fall.

1315. Detour, Lake Huron, Michigan.—The boathouse was moved nearer the lake, new ways were provided, and a landing crib was built. The old fog-signal house was converted into a barn. A contract was made for furnishing duplicate fog-signal boilers and appurtenances. Various repairs were made.

1316. Round Island, Straits of Mackinac, Michigan.—Contracts were made for the metal work. The erection of the building under contract was completed. The station building consists of a substantial two-story brick house with a square brick tower at one corner, standing on a square concrete pier faced with vitrified brick. The interior contains fog-signal boiler rooms on the first story and six rooms above for the accommodation of the keepers. The interior is finished in hard wood. Plans and specifications for duplicate fog-signal boilers and machinery were made, and they were contracted for soon after. On May 15, 1896, a light of the fourth order showing fixed white, varied by a red flash every 20 seconds, was established.

Eleventh District.

1319. Cheboygan, Straits of Mackinac, Michigan.—The water supply was improved by building four new cribs opposite the fog-signal house connected by bridges and extending out 280 feet. The outer crib contains a well with 3 feet 6 inches depth of water. A fire-plug ejector is located here with steam and water supply pipes to the house. A tank was erected in the signal house, and receives the water from the supply. The piping was all covered and boxed, as a protection against freezing. An additional crib was built 150 feet beyond the outside crib for future extension and for the convenience of landing supplies. The boathouse was moved nearer to the lake and the water-supply cribs. New boat ways and rollers were provided. The sidewalks were renewed, and various repairs were made.

1325. Sweets Point, St. Marys River, Michigan.—The exposed sides (west, north, and east) of this crib were covered at the water level with steel plating one-eighth of an inch thick and 3 feet high as a protection from ice.

1327, 1328. Pilot Island Range, St. Marys River, Michigan.—The front range was moved about 500 feet to the eastward of its former position. The rear range was also moved about 500 feet to the eastward of its former position, and reestablished about 500 feet in rear of the front range. A watch room and 215 feet of walk and landing were built. On June 4, 1896, the color of these was changed from red to white.

—. *Mud Lake, St. Marys River, Michigan.*—This important turning point is now marked only by a buoy and distant range lights on shore. They are not effective guides. It is proposed to establish a light to mark this turning point in the channel through Mud Lake by a proper light. It is estimated that this can be done for $3,500, and it is recommended that an appropriation of this amount be made therefor.

1329, 1330. Winter Point Range, St. Marys River, Michigan.—A landing 1,008 feet long was built, with a walk on top, giving 3 feet 6 inches of water at the outer end. Walks were provided to connect the sidewalk with the landing. New brick piers were built at the rear range, one being enlarged and capped with iron plate. Minor repairs were made.

1332, 1333. Dark Hole (east) Range, St. Marys River, Michigan.—The front range was moved 200.7 feet westerly and the rear range 200.7 feet westerly, and reestablished 512 feet in rear of the front range.

—. *Dark Hole (west) Range, St. Marys River, Michigan.*—On September 11, 1895, these lights were discontinued.

1334, 1335. Point of Woods Range, St. Marys River, Michigan.—The front range was moved 114 feet to the northward. The rear range was also moved, and reestablished 304 feet from the front range.

1342, 1343. Indian Point Range, St. Marys River, Michigan.—The wooden upright from which the rear light was shown was struck by lightning and badly damaged. The post was replaced September 28, and the light was reestablished.

Eleventh District.

1346. *Lower Lake George, St. Marys River, Michigan.*— A new crib, 24 feet square, bearing an octagon lamp house and a post, was placed here. A row of ten 12-inch piles was driven on the channel side and bolted to the crib. The location of the new crib is about 12 feet south of the old crib. The spaces between the cribs are heavily riprapped with large bowlders.

1347. *Middle Lake George, St. Marys River, Michigan.*—The dwelling was leveled up and the space between the deck and the water table was filled in. A frame lamp house was provided, and located at the rear.

1349. *Church Point, St. Marys River, Michigan.*—This crib was repaired in the fall. The crib was wrecked by the ice, so a new crib was built and sunk in 11 feet of water adjoining the site of the old crib and filled with stone to the water level, and 29 cords of riprap stone placed around it. The superstructure was framed and three courses put on.

1364, 1365. *Sault Range, St. Marys River, Michigan.*—The front range was straightened, and a new walk was laid from the light to the shore.

1366–1392. *Hay Lake Channel, St. Marys River, Michigan.*—The construction of these lights was continued. During July stations 7 and 9 were completed. Station 10 was completed with stone piers ready for towers. Station 11 was partly constructed with stone piers. At station 12 timbers for the superstructure were framed. At station 16 oak planking and corner irons were finished on four courses, and the post and lamp house were completed, ready to place. Stations 17, 18, and 22 were completed, ready for their towers. Stations 19 and 21 were completed, ready for the superstructure. At station 20 the balance of the material for the piers was delivered. At stations 26 and 27 lamp houses were constructed, ready to place. The crib for station 25 was towed to its site, sunk in place and nearly filled with ballast stone; the frame of the dwelling was erected, sheathed, and the work on exterior finish begun. At the dike a dwelling was erected, the exterior carpentry was completed, except the porch, the interior rough carpentry and lathing was finished, the east wing and upper story of the west wing were brown-plastered, and the porch was partly built. The construction of the seven skeleton iron towers under contract with the Indiana Bridge Company of Muncie, Ind., was completed, inspected, and shipped to Sault Ste. Marie. The system of lights was tested on September 27, and found to work satisfactorily. The lights were put in operation on September 30, 1895. Plans, specifications, and estimate of cost were made for the construction of seven cribs in this channel by contract.

1384, 1385. *Frechette Point Range, Hay Lake Channel, Michigan.*—The towers of the range were so modified as to make the height of the focal planes above lake level 40 feet for the front and 54 feet for the rear light.

Eleventh District.

1386, 1387. Six-Mile Point Range, Little Rapids Cut, Hay Lake Channel, Michigan.—The towers of the range were so modified as to make the height of the focal planes above lake level 40 feet for the front and 54 feet for the rear light.

1394. St. Marys Falls Canal south pier, St. Marys River, Michigan.—The small crib on which the oil house stands and the boathouse were rebuilt. The lantern deck railing, which was damaged by a passing vessel, was repaired. Various minor repairs were made.

1395, 1396.—St. Marys River (lower) Range, Michigan.—The shore at the front station was protected by a revetment of crib work filled with ballast stone, and extending 185 feet from the boat landing to the front of the beacon.

—. *Head of St. Marys River, St. Marys River, Michigan*—Two lights are now maintained at the head of St. Marys River at private expense. It is proposed to replace them with a set of range lights to mark the channel at the entrance to St. Marys River. It is estimated that this can be done for $1,000, and it is recommended that an appropriation of this amount be made therefor.

1399. Point Iroquois, Lake Superior, Michigan.—The bell tower was taken down and transported to Grand Marais, Mich., for use there.

1400. Whitefish Point, Lake Superior, Michigan.—The work on the alterations and additions to the keeper's dwelling was completed during July, 1895. The tower was painted white, changing its color from brown. The characteristics of this light were changed from fixed white varied by red flash every 20 seconds to a flashing white every 5 seconds on the opening of navigation season of 1896. An estimate was made of the cost of rebuilding and enlarging one fog-signal house for the accommodation of the new plant, covering it with corrugated iron, and erecting new boilers and machinery. A contract was made for furnishing duplicate boilers and machinery. The material required for rebuilding and enlarging the fog-signal building was purchased, and was delivered at the station by the tender *Amaranth.*

—. *Crisps Point, Lake Superior, Michigan.*—This is a dangerous point for vessels bound down the lake in thick weather. These vessels all try to make Whitefish Point, but a slight variation in their course from the nearest point of departure will run them ashore near Crisps Point. Several wrecks have occurred here. It is proposed to establish a light and fog-signal station on or near Crisps Point. This it is estimated can be done for $18,000, and it is recommended that an appropriation of this amount be made therefor.

1401. Grand Marais Harbor of Refuge, Lake Superior, Michigan.—Modified plans and estimate were made for a keeper's dwelling. Plans were made for the pierhead tower and elevated walk, and the greater portion of material was ordered. Bids were obtained for furnishing the metal work and fog bell of the pierhead light. The bell tower at Point

Iroquois was taken down and transported to this station. The material for the beacon tower and fog bell was purchased and delivered. The framework of the bell tower was raised and securely bolted on the pier, the iron work was placed, and an elevated walk was completed from the tower to the shore line. The work was completed during November, and on December 10, 1895, the sixth-order fixed white light and the fog bell were established.

The unexpended balance of the $15,000 appropriated by the act of March 2, 1895, for "a light and bell" at this place is sufficient for the construction of an additional light on shore to serve as a range and for the erection of a keeper's dwelling. The appropriation was evidently intended to cover the expense of erecting a complete station, but the wording of the act is ambiguous. It is therefore recommended that the Board be authorized to use so much as is needed of this unexpended balance for erecting the additional light needed to serve as a range and for the erection of a keeper's dwelling.

—. *Grand Marais Reservation, Michigan.*—A surveyor was sent to make a survey of this light-house reservation and to mark the boundary. Five permanent stone monuments were placed.

1403. Big Sable, Lake Superior, Michigan.—The sundry civil appropriation act approved June 11, 1896, provided $5,500 for the establishment of a steam fog signal at this station. Plans and specifications were made for duplicate fog-signal boilers and machinery.

1408. Marquette, Lake Superior, Michigan.—The barn was converted into a keeper's dwelling. Various repairs were made.

1411. Big Bay Point, Lake Superior, Michigan.—The deed for a site for this light and fog-signal station was obtained, approved, and registered. Preliminary plans and estimate of cost were made. Blue-prints were made of the signal house, oil house, boathouse, and men's quarters to be erected. Modified plans of the light-house tower and dwelling were prepared during January. Bids were obtained for all the material required in the construction of this station. Plans and specifications were made for duplicate fog-signal boilers and machinery. Contracts were made for the construction of the metal work and it was purchased and delivered at the light-house depot. The materials for the station were delivered at the light-house depot in April. A contract was made for furnishing duplicate fog-signal boilers and machinery. The working part with the materials was sent to the site on the light-house tender *Amaranth.* The camp buildings were erected, crib landing made, and 600 feet of tramway track laid. A road was cut through woodland to the fog-signal site and continued diagonally uphill to the proposed site of the tower, about 2,500 feet in all. Much clearing was done in the vicinity of the fog-signal building and along the shore line of the site. The fog-signal building is located 750 feet from the northwesterly boundary and 70 feet from the shore line. The brick work was finished, plates put on, and rafters placed. Negotiations were opened for the purchase of additional land required for a site. Excavations were made for the foundations of the tower and dwelling and the concrete footings were completed. Brick work was begun, and when June closed all the walls of the dwelling were nearly completed. The tower walls were completed to the top of the second-story windows. All floor joists were placed and bridged, subfloors laid, and all partitions and grounds of the first story were set, ready for lathing. Nearly all rafters were placed and partly boarded. The cornices of the west wing, front and rear, and the east wing front were in place. The fog-signal house was roofed in and nearly completed. The boathouse and barn were completed. A woodshed was built near the dwelling. Bound stones were placed. Fence posts were cut and peeled, and one hundred were set in place. The station is to be completed in the early fall.

1412. Huron Island, Lake Superior, Michigan.—A brick oil house with iron roof, door and shelving, and concrete floor was erected. The landing crib was leveled up, repaired, and redecked. New boat ways with rollers were placed.

1415. Portage River, Keweenaw Bay, Lake Superior, Michigan.—The light which marks the approach to Portage River is sufficient except during thick weather. When the light can not be seen a fog signal is decidedly necessary. A proper fog signal can be established here for $5,500, and it is recommended that an appropriation of this amount be made therefor.

1418, 1419. Portage River range, Lake Superior, Michigan.—This range was rebuilt and placed on the prolongation of the axis of the dredged channel. For the front light a crib 18 feet square rising 4 feet above the water was built in 6 feet of water on the east bank of the channel. A mast with oval day mark with a hood, brackets, etc., to receive a lantern was erected. Back of the mast a lamp house was erected. The structure was painted white. For the rear light a mast about 30 feet long was erected on shore 600 feet southerly from the front light; four timbers were framed and placed at right angles on the bottom, and covered with about 4 cords of stone ballast to make a secure base. Day mark, hood, and brackets were made for this post similar to those for the front light. A lamp house was built in the rear of the mast and a plank walk was built to the river shore.

—. Portage Lake and River lights, Lake Superior, Michigan.—The sundry civil appropriation act approved June 11, 1896, provided $10,500 for the establishment of these lights. Steps will be taken to secure the sites without delay.

1422. Mendota, Lake Superior, Michigan.—Bids were obtained for furnishing the material for the construction of this light-station. Contracts were made for the metal work. The material was delivered by the tender *Amaranth* at the site in September, 1895, and the cook house, quarters for the men, etc., were erected. The old house was torn down, and all the material that could be used in the new structure was cleaned and piled. The foundation of the tower and dwelling was completed and the brick work was laid up to the top of the first-floor joists. The boathouse was almost completed and the fence posts were all set. During October the oil house and the outhouses were completed. The dwelling and all outbuildings, laying sidewalks, etc., were completed in November. On November 30, 1895, a fourth-order flashing white light, varied by a white flash every 45 seconds, was established here.

1424. Gull Rock, Lake Superior, Michigan.—The metal work for the construction of an oil house was delivered at the light-house depot.

1428. Eagle Harbor, Lake Superior, Michigan.—Bids were accepted for furnishing the material for a fog signal, and the material was furnished. The construction of the fog signal by hired labor was begun in September, excavations were made, concrete footings were put in, and foundation walls were built. The building was framed, exterior walls and roof were covered with plank, the cornice was ironed, the interior walls were sheathed, and the filling of the walls with sawdust and mortar was done. The iron roof was put on and the grading was done around the building. A water-supply crib 12 by 24 feet was framed, the ironing of the entire building was finished, tank erected, workbench and tool closet built, concrete floor laid, interior painting completed, boilers and appurtenances set up and tested to 80 pounds pressure, water-supply pipes placed, and pipe fitting done for pumps and Crosby signals. The water-supply and landing crib was sunk in place, ballasted, and built to 3 feet 9 inches above lake level, a house was built over the supply well, and a trestle walk to the engine house was constructed. The building was completed in November. The Crosby automatic signals were erected, the plank walks around the signal house were completed, and the entire station was completed according to plans. On November 30, 1895, the fog signal at this station was established. A brick oil house was erected, a 6-inch crock drain of 140 linear feet was laid, and the grading of the site was completed. Various minor repairs were made to the keeper's dwelling.

1431. Eagle River, Lake Superior, Michigan.—The moving of this light to Sand Hills, at a cost not to exceed $20,000, was authorized by the act approved February 15, 1893, but no appropriation therefor has yet been made. Recommendation is made that the amount named be appropriated. Various repairs were made.

1432. Portage Lake Ship Canal, Lake Superior, Michigan.—A brick oil house with iron door, shelves, and roof was erected and a concrete floor was laid. A sewer was laid from the house to the canal. Plans, specifications, and estimate of cost of improving the tower and dwelling were made. Bids were accepted for furnishing the material required in reconstructing the keeper's dwelling and rebuilding part of the elevated walk, and the material was delivered at the light-house depot and loaded on the *Amaranth* for delivery at the station.

1433. Portage Lake Ship Canal Pierhead, Lake Superior, Michigan.—The beacon was moved to a position in front of the bell tower, the timber for the third story of the new beacon was framed, and the elevated walk was repaired. The deck plates, lantern, and roof lining of the lantern of the beacon were put up, and 204 feet of new elevated walk was erected between the signal house and the angle in the pier, making in all 362 feet of new elevated walk at this station. The work of establishing a fog signal was begun in August. A substructure was completed, the building was framed and raised, and the inside, outside, and roof sheathing were put on. The fog-signal boilers and machinery were washed into the canal by the storm of September 22, and were all recovered by a wrecking outfit brought from Marquette, Mich., with the exception of some minor fittings, which were replaced. Stairs and walk were built between the signal house and the tower, and 16 feet of walk were laid at the inner end of the signal house. The work on the fog-signal house was completed in November, and boilers were placed. Much work was done from December 1 to 16, when the station was put into operation on the opening of navigation in 1896.

1440. Chequamegon Point, Lake Superior, Wisconsin.—Negotiations for the purchase of a light-house site were opened in July and finished on March 18, 1896, requests to be made for the consent of the State to the purchase. Plans and estimates were made for the work of moving and rebuilding the main light at Lapointe, Wis., and establishing a light and fog bell at Chequamegon Point. Contracts were made for the construction and delivery of the metal work for the Lapointe light tower, Wisconsin, and for the construction and delivery of the metal work for an iron beacon for Chequamegon Point. Bids were obtained for furnishing the material for the construction of this light, and the material was ordered. The matter of obtaining the consent of the State to the purchase of the site required at this point was in the hands of the governor.

It has not been found practicable to complete the important improvements at this station, as directed by the act approved March 2, 1895, within the limits of the appropriation made for the purpose. It is therefore recommended that an additional appropriation of $1,500 be made for completing the work and moving and rebuilding the main Lapointe light and establishing a harbor bell and light at or near Chequamegon Point, Lake Superior, Michigan.

—. *Bayfield, Lake Superior, Wisconsin.*—The establishment of a light here at a cost not to exceed $5,000 was authorized by the act approved February 15, 1893, but no appropriation therefor has yet been made.

1442. Devils Island, Lake Superior, Wisconsin.—The amount of the award for this island, $1,600, was paid in August, 1895. A quit-claim deed to the United States for the extinguishment of the outstanding tax title against Devils Island, Wisconsin, was duly recorded. A design was made for an iron tower.

By the sundry civil appropriation act approved June 11, 1896, authority was given that $4,000 of the unexpended balance, or the appropriation of $22,000, made in the act approved March 20, 1895, for constructing a tower at Devils Island light-station, be applied to the construction of a light-keeper's dwelling at Devils Island light and fog-signal station. This will be done as soon as practicable.

1445–1462. Superior Bay post lights, Wisconsin and Minnesota.—The 18 post lights established here in 1893 were destroyed by ice and by passing rafts.

1465. Two Harbors, Lake Superior, Minnesota.—The barn was converted into an assistant keeper's dwelling by contract in July, 1895. A cistern was built for water supply. The sale by auction of lot 1, block 6, in the village of Two Harbors, Minn., was advertised.

1466. Two Harbors Breakwater, Minnesota.—On December 14, 1895, a post light was established on the west end of the breakwater, from which a white 8-day lantern light was exhibited. Material for a boathouse was purchased.

1467. Grand Marais, Lake Superior, Minnesota.—Title was obtained to the site for a dwelling for this station. Plans, specifications, and estimate of cost for a keeper's dwelling were made. Bids were obtained for furnishing the material and labor necessary for the construction of a keeper's dwelling, but the lowest bidder declining to enter into contract, bids were again obtained. Contract papers were prepared, but the bidders having declined to enter into contract, bids for the work were a third time obtained.

—. *Rock of Ages, Lake Superior, Michigan.*—During the season of southerly and westerly winds many vessels bound to and from Duluth by taking a course along the north shore of the lake and in lee of Isle Royale are enabled to run when the lake is too rough for the more southerly course. A light and fog signal on the dangerous rocks off the westerly end of Isle Royale would be a valuable aid to these vessels. It is therefore proposed to establish a light and fog-signal station on the Rock of Ages off the western end of Isle Royale. This it is estimated can be done for $50,000, and it is recommended that an appropriation of that amount be made therefor.

REPAIRS.

More or less extensive repairs were made at each of the following stations during the year:

1269. Belle Isle, Mich.
1289. Russell Island (middle, No. 11), St. Clair River, Mich.
1300. Pointe aux Barques, Mich.
1301. Port Austin Reef, Mich.
1304. Charity Island, Mich.
1307. Sturgeon Point, Mich.
1309. Thunder Bay Island, Mich.
1312. Presque Isle, Mich.
1314. Spectacle Reef, Mich.
1317. Bois Blanc, Mich.
1320. Cheboygan Crib, Mich.

Eleventh District.

1321, 1322. Cheboygan River Range, Mich.
1344, 1345. Duck Island Range, Mich.
1348. Upper Lake George, Mich.
1356. Palmers Point, Mich.
1371. North Side (upper, No. 6), Middle Neebish Cut, Mich.
1372 Front range, No. 7, Hay Lake Channel, Mich.
1373. Rear range, No. 9, Middle Neebish Cut, Mich.
1375, 1376. Front and rear, Nos. 10 and 11, Lower Hay Lake Cut, Mich
1413. Stannard Rock, Mich.
1415. Portage River, Mich.
1416, 1417. Portage Range, Mich.
1426, 1427. Copper Harbor Range, Mich.
1429, 1430. Eagle Harbor Range, Mich.
1434. Fourteen-Mile Point, Mich.
1435. Ontonagon, Mich.
1438. Michigan Island, Wis.
1444. Superior Pierhead, Wis.
1463, 1464. Duluth Range, Minn.
1469. Passage Island, Mich.

LIGHT-VESSELS.

1274. Grossepoint light-vessel, No. 10, Lake St. Clair, Michigan.—The illuminating apparatus is adequate and in serviceable condition. The vessel is somewhat rotten in her upper works and decks.

1294. Lake Huron light-vessel, No. 61, at the foot of Lake Huron, Michigan.—This vessel is in an efficient condition. A large steamer having grounded near this vessel in June, it became necessary to more definitely fix the limits of the dredged channel than can well be done with a light-vessel lying to varying quantities of chain. The red 35-foot spar buoy soon to be placed is to effect this purpose.

—. Martins Reef light-vessel, northwestern end of Lake Huron, Michigan.—It is proposed to place a light on Martins Reef as an aid to the great and increasing traffic between the mouth of the St. Marys River and the Straits of Mackinac. Since the great development of steel works at Chicago, Milwaukee, and Joliet, and the discovery of new and cheap ores, suitable for making steel, on the northerly shore of Lake Superior, the commerce passing from the mouth of the St. Marys River through the Straits of Mackinac into Lake Michigan has increased with rapidity. It is several times greater than it was 5 years ago. The vessels carrying ore from Duluth and Two Harbors to Lake Michigan ports are the largest in the lake marine class. These vessels pass close to the dangerous Martins Reef, hence a light-vessel there is much needed. It is estimated that a proper light-vessel can be built and placed there for $15,000, and it is recommended that an appropriation of this amount be made therefor.

1318. Poe Reef light-vessel, No. 62, Straits of Mackinac, Michigan.—The illuminating apparatus is in good condition. The vessel is in fair condition only.

The following statement appeared in the Board's annual report for 1893:

> The establishment of a light-ship on this station, at a cost not to exceed $25,000, was authorized by the act approved February 15, 1893, but no appropriation therefor has yet been made. The Board recommends that the amount named be appropriated.

Eleventh District.

The following paragraph appeared in the Board's annual report for 1894:

> No direct appropriation was made for this purpose, but Congress authorized, in the sundry civil appropriation act approved August 5, 1892, "that the appropriation of $60,000 heretofore made in the act approved August 30, 1890, for establishing a light-station at or near Eleven-Foot Shoal, off Point Peninsular, Michigan, be applied, under the direction of the Light-House Board, for the construction, or purchase, and equipment of one or more light-ships for service on the Great Lakes, and that said appropriation be made immediately available for such ships."

Thereupon three light-vessels were built from the appropriation named, one of which, No. 62, was placed off Poe Reef in September, 1893.

This vessel while in fair condition is not appropriate for so exposed a station. It is therefore proposed to take light-ship No. 62 off this station and use her as a relief light-vessel when she can be replaced by a new and more substantial vessel. A light-vessel suitable for this position can be built for $15,000, and it is recommended that an appropriation of this amount be made therefor.

FOG SIGNALS OPERATED BY STEAM OR HOT-AIR ENGINES.

1293. Fort Gratiot, Michigan.—This 8-inch steam whistle was in operation some 195 hours, and consumed about 16 tons of coal.

1294. Lake Huron light-vessel, No. 61, Michigan.—This 6-inch steam whistle was in operation some 207 hours, and consumed about 7 tons of coal.

1296. Sand Beach Harbor of Refuge north main light, Michigan.—This 10-inch steam whistle was in operation some 270 hours, and consumed about 22 tons of coal.

1301. Port Austin Reef, Michigan.—This 10-inch steam whistle was in operation some 221 hours, and consumed about 14 tons of coal.

1309. ThunderBay Island, Michigan.—This 10-inch steam whistle was in operation some 408 hours, and consumed about 24 tons of coal.

1312. Presque Isle, Michigan.—This 10-inch steam whistle was in operation some 429 hours, and consumed about 27 tons of coal.

1314. Spectacle Reef, Michigan.—This 10-inch steam whistle was in operation some 400 hours, and consumed about 17 tons of coal.

1315. Detour, Michigan.—This 10-inch steam whistle was in operation some 436 hours, and consumed about 30 tons of coal.

1318. Poe Reef light-vessel, Michigan.—This 6-inch steam whistle was in operation some 398 hours, and consumed about 21 tons of coal.

1319. Cheboygan, Michigan.—This 10-inch steam whistle was in operation some 509 hours, and consumed about 39 tons of coal.

1399. Point Iroquois, Michigan.—This 10-inch steam whistle was in operation some 489 hours, and consumed about 23 tons of coal.

1400. Whitefish Point, Michigan.—This 10-inch steam whistle was in operation some 590 hours, and consumed about 32 tons of coal.

Eleventh District.

1408. Marquette, Michigan.—This 10-inch steam whistle was in operation some 374 hours, and consumed about 28 tons of coal.

1412. Huron Island, Michigan.—This 10-inch steam whistle was in operation some 144 hours, and consumed about 7 tons of coal.

1413. Stannard Rock, Michigan.—This 10-inch steam whistle was in operation some 361 hours, and consumed about 17 tons of coal.

1423. Manitou, Michigan.—This 10-inch steam whistle was in operation some 481 hours, and consumed about 26 tons of coal.

1428. Eagle Harbor, Michigan.—This 10-inch steam whistle, established November 30, 1895, was in operation some 73 hours, and consumed about 6 tons of coal.

1434. Fourteen-Mile Point, Michigan.—This 10-inch steam whistle was in operation some 93 hours, and consumed about 2 tons of coal.

1437. Outer Island, Wisconsin.—This 10-inch steam whistle was in operation some 129 hours, and consumed about 9 tons of coal.

1439. Lapointe, Wis.—This 10-inch steam whistle was in operation some 150 hours, and consumed about 8 tons of coal.

1442. Devils Island, Wisconsin.—This 10-inch steam whistle was in operation some 177 hours, and consumed about 4 tons of coal.

1444. Superior Pierhead, Wisconsin.—This 6-inch steam whistle was in operation some 340 hours, and consumed about 20 tons of coal.

1463. Duluth (front) Range, Minnesota.—This 10-inch steam whistle was in operation some 466 hours, and consumed about 24 tons of coal.

1465. Two Harbors, Minnesota.—This 10-inch steam whistle was in operation some 334 hours, and consumed about 21 tons of coal.

1469. Passage Island, Michigan.—This 10-inch steam whistle was in operation some 382 hours, and consumed about 21 tons of coal.

BUOYAGE.

The buoyage, with the exception of that of Duluth Harbor, has been efficiently cared for, and an effective daily patrol appears to be assured for the remainder of the open season. The Duluth service has left much to desire, but with a system of supervision by the local light-keeper, which has just been inaugurated, an improvement is anticipated. The buoyage of Lake St. Clair will be attended to by the tender *Marigold*, with the local supervision of the master of the Grossepointe light-ship, No. 10, even after the entire cut is completed. A few spare buoys will be kept on the light-vessel. The floats in the St. Marys River (Hay Lake Channel), from the Detroit headquarters, are to be looked after by a local care taker.

DEPOT.

Detroit, Mich.—The iron store shed was painted and the material was purchased for repairs to the derrick. The water pipes in the custodian's dwelling were repaired. The old timbers under the turntable were removed and 12 inches of concrete laid, in which the castings were set. An 8-inch wall was built around the turntable, and 251 feet of 6-inch sewer crock and 24 feet of 4-inch sewer crock were laid 6 feet under ground and connections made with the basin under the turntable and with the conductor pipe and waste pipe in the lamp shop. About 250 feet of ¾-inch steel hoist rope, one single and one double block, and one sheave were provided for the hoisting derrick. Bids were obtained for dredging the slips at the depot. These being rejected, other bids were obtained. About 3,000 yards of material was dredged from the slips adjoining the depot wharf, and 14 feet of water was secured.

District lamp shop.—The old slag roof of the district lamp shop was removed and a new roof of tin shingles was provided, which received two coats of paint. Tools and hardware were purchased for general service in the shop.

TENDERS.

The Marigold.—This iron screw steamer was employed from the opening of navigation. She steamed about 14,233 miles, and consumed some 717 tons of coal. She is in excellent condition as regards hull, boiler, and machinery.

The Amaranth.—This steel screw steamer was employed during the season of 1895 in delivering materials for construction and repairs at Presque Isle, Cheboygan, Point Iroquois, Whitefish Point, Huron Island, Stannard Rock, Portage River, Portage Range, Manitou Gull Rock, Copper Harbor, Eagle Harbor, Portage Lake Ship Canal Pierhead, Fourteen-Mile Point, Outer Island, Sand Island, Two Harbors, and Isle Royale light-stations, Michigan. She was employed during August on inspection duty and during October in delivering materials for construction at Grand Marais, Mich. She was put in winter quarters at the Detroit light-house depot at the end of November. Contracts were made for furnishing ship chandlery, paints, oils, lamps and wicks, hardware and tools, dry goods, and crockery required for use on the *Amaranth*, and the goods were delivered at the light-house depot. Oak fender wales were placed under the iron beading at the level of the main deck. She was loading in April at the Detroit light-house depot with material for the construction of Big Bay Point light-station. The steam launch, scow, small boats, and fenders were overhauled, and minor repairs were made. The spar deck was repaired and the interior and exterior painting were completed. The *Amaranth* was employed during May in delivering materials for repairs at Whitefish Point, Mendota, Huron Island, Portage Range, Portage Lake Ship Canal, and Eagle Harbor light-stations, and in conveying workmen and materials to Big Bay Point light-station. During June she delivered materials for repairs at Whitefish Point, Stannard Rock, and Portage Lake Ship Canal Pierhead light-stations, and for the construction of Big Bay

Point light-station, Michigan. A portion of the material for the construction of Forty-Mile Point light-station was loaded on board the tender. During the year she delivered 2,203 tons of material and steamed 12,952 miles on a consumption of 980 tons of coal. While in winter quarters she consumed 120 tons of coal. The total mileage made by the *Amaranth* in both the Ninth and Eleventh districts was about 15,492 miles on a consumption of about 1,105 tons of coal.

TWELFTH DISTRICT.

This district extends from the boundary between California and Mexico to the boundary between California and Oregon. It embraces all aids to navigation on the seacoast, bays, rivers, and other tidal waters of California.

Inspector.—Commander Henry E. Nichols, United States Navy, to September 30, 1895; since then Commander Frank Courtis, United States Navy.

Engineer.—Maj. William H. Heuer, Corps of Engineers, United States Army, to January 31, 1896; since then Maj. Charles E. L. B. Davis, Corps of Engineers, United States Army.

There are in this district—

Light-houses and lighted beacons, including 3 post lights	39
Day or unlighted beacons	46
Lighted beacons used also as day marks	7
Fog signals operated by steam	15
Fog signals operated by clockwork	7
Fog signal operated by hand	1
Whistling buoys in position	12
Bell buoys in position	7
Other buoys in position	72
Steamer *Madroño*, buoy tender, and for supply and inspection	1
Steam launch of *Madroño*	1
Steam launch *Hazel*, for construction and repairs	1

LIGHT-STATIONS.

981. Point Loma, entrance to San Diego Bay, California.—The small frame building which was used as a storehouse for supplies landed at Ballast Point and destined for Point Loma was moved from its former position to La Plays and placed near the quarantine station, convenient to the landing place and to the road to the station. This road is in fair condition, while the road formerly used, over the hill from Ballast Point, is almost impassable and can not, with any reasonable expense, be put in order. The keeper has been authorized to move the barn from its present site to a position on the opposite side of the dwelling, so as to avoid the nuisance caused by the wind carrying the foul odors into the living apartments. The clay bank near the tower is being eroded, and this may in time undermine the tower. Measurements have been taken and will be repeated from time to time to obtain the rate of cutting so as to provide remedial measures in time to prevent serious damage. Various repairs were made.

Twelfth District.

988. Point Hueneme, entrance to Santa Barbara Channel, California.—The following statement was made in the Board's annual report for 1894:

> As the efforts made to secure a right of way to and from this station for any reasonable price, under the appropriation of $250, have failed, it is proposed, as was stated in the Board's last annual report, to obtain it by condemnation. It is estimated that this will cost not exceeding $3,000. It is recommended, therefore, in view of the great necessity for the road, that an appropriation of $3,000 be made for this purpose.

The Board renews and urges this recommendation.

990. Point Conception, entrance to Santa Barbara Channel, California.—The work of reconstructing the water supply of this station, as outlined in the last annual report, was completed in July, 1895. During the spring of this year the pipe line running along the face of the cliff was broken by falling rocks. The pipe was repaired, and to prevent a recurrence of the accident the overhanging cliff was blasted off for a distance of 150 feet back from the edge and the pipe brought in and fastened to the face of the rocks. Other threatening bowlders were also blasted off. Various repairs were made.

—. *Point Arguello, about 12 miles northwest of Point Conception, seacoast of California.*—The following recommendation, which appeared in the Board's annual report for the last seven years, is renewed:

> This point is about 12 nautical miles to the northward and westward of Point Conception. It is reported to be one of the foggiest places on the Pacific coast. In consequence of the sharp bend in the coast, the outlying rocks, and the almost constant fog that prevails, Point Arguello is one of the most important points on the coast at which a light and fog-signal station should be established. The United States already owns the site which is deemed most suitable for the buildings. It is therefore estimated that the work can be done at a cost not to exceed $35,000, and it is recommended that an appropriation of this amount be made therefor.

993. Point Sur, seacoast of California.—The water supply is from a well on the sand spit supplied by springs from the hills; but as it is near the ocean level the water at times becomes slightly brackish and unfit for domestic use. It is proposed to remedy this by catching the rain water from the roofs of the buildings and storing it in wooden cisterns which will be provided. Various repairs were made.

The quarters at this station are insufficient to accommodate the keepers. One of them is now living in a small temporary structure that was erected for the use of the superintendent of construction while the station was being built. A proper keeper's dwelling can be erected for $6,000. It is recommended that an appropriation of this amount be made therefor.

Point Pinos, entrance to Monterey Bay, California.—The following recommendation, which was made in the Board's annual reports for the last seven years, is renewed:

> The plot of land owned by the Government at this station does not touch the sea at any point on its boundary line. For convenience in landing stores and supplies it is essential that the United States should own the strip of land between the light-

house lot and the seacoast. The owners have offered to sell the land desired for $2,000, and the Board recommends that an appropriation be made for its purchase.

995. Santa Cruz, entrance to Santa Cruz Harbor, California.—This station was connected with the water supply of Santa Cruz City. Various repairs were made.

996. Año Nuevo Island, seacoast of California.—A 35,000-gallon tank was erected on a masonry foundation to afford additional water-storage capacity. Various repairs were made.

997. Pigeon Point, extreme end of Pigeon Point, Pacific Ocean, California.—A 15,000-gallon tank was put up as a fire protection and connected with the spring and the dwelling. A new 3-inch pipe line was laid from the watershed to the dwelling and fog signal. The water supply is now ample.

The following recommendation made in the Board's last two annual reports is renewed:

> There are standing outside of the light-house site, but close to the fence inclosing the light-house structures, a fisherman's shanty and a hay barn. If a fire should break out in either of these buildings it would endanger the structures of the light-station. It is proposed, in order to obviate this danger, that an additional strip of land to the eastward of the station, say 150 feet wide, be purchased and added to the light-house reservation. This it is estimated can be done for not exceeding $5,000, and it is recommended that an appropriation of this amount be made therefor.

999. Farallon Island, on Southeast Farallon Islet, off the entrance to San Francisco Bay, Pacific Ocean, California.—Great difficulty has at certain times of the year been experienced in landing at the North Landing, where the hoisting derrick and engine are situated. At these periods it was observed that a cove on the southern part of the island was sheltered and that a landing might be effected there. To make this landing available, a derrick was erected and a platform built around it on the rocks; a wire cable was stretched across the gulch as a fastening for the landing line. This arrangement will be very useful for the future landing of supplies. Slight repairs were made to the tramway, but the entire trackway will be rebuilt during the coming year. A comparative test of the relative efficiency of whistles and sirens as fog signals was made here in March, 1896, by the district officers, and it was satisfactorily determined that the siren was the better signal. Various repairs were made.

1001. Fort Point, San Francisco Bay, California.—The rain water catchment was completed. An additional 25,000-gallon tank was purchased and erected on the hill back of the dwellings, at a height above the top of the dwellings, and a 1½-inch pipe led from it into the light-house grounds, as a protection to the buildings in case of fire.

—. *Quarry Point, Angel Island, San Francisco Bay, California.*—The following recommendation made in the Board's last four annual reports is renewed:

> Various petitions were received from those representing marine interests asking that a fog signal be established at this point. The passage between the eastern side

Twelfth District.

of Angel Island and Southampton Shoal is quite narrow. The strong tides setting in and out through the Golden Gate have full force on a vessel bound up or down the bay, and in the case of ships being towed, as so many are past this point, the set of the current is enough to make it hazardous, there being danger either of running aground on Southampton Shoal or Angel Island. An enormous quantity of shipping annually passes this point, bound to and from the great grain wharves at Port Costa, the Sacramento and San Joaquin rivers, and Mare Island Strait. Hundreds of the largest sailing ships are towed from San Francisco to Port Costa, where they load with grain, and are then towed down and out to sea. In this way there is more shipping passing through these waters than anywhere else in the district, except through the Golden Gate. There have been a number of casualties in the vicinity of this point.

Among many were the following:

The ferry steamer *Contra Costa*, plying between San Francisco and San Quentin with passengers, ran ashore near California City.

The ship *E. B. Sutton*, while being towed down from Port Costa, ran ashore near Quarry Point, Angel Island.

The ship *Eleanor Margaret*, bound to Port Costa, ran ashore on Bluff Point, Raccoon Straits.

The ship *Maulsden*, while being towed to Port Costa, ran ashore on Southampton Shoal.

Mariners have asked that Quarry Point be selected for the fog-signal station, because, to make a start upriver in a fog, it is necessary to make Angel Island to get a departure. After careful examination the Board reached the conclusion that a fog signal at this locality would be a decided aid to mariners. In view of the great economy of establishing and maintaining a large fog bell here instead of a steam fog signal, it decided in favor of the former. It is estimated that it will cost $6,000 to establish this fog bell, and it is recommended that an appropriation of this amount be made therefor.

1005. Yerba Buena, on southeast extremity of Yerba Buena Island, San Francisco Bay, California.—The landing platform was torn down and rebuilt on stone walls. Various repairs were made.

1010. East Brother Island, entrance to San Pablo Bay, California.—A 25,000-gallon tank was purchased and erected on a substantial foundation. This will afford increased water-storage capacity and also enable the keeper to empty and clean the old brick cistern.

1011. Mare Island, entrance to Karquinez Strait from San Pablo Bay, California.—The water supply is inadequate. The station was therefore connected with the water system of Vallejo by a pipe line 7,000 feet in length, 1,450 feet of which is laid under the bay. The greatest depth of water encountered was 54 feet. The flow of water at the station is now 1,000 gallons per hour. Various repairs were made.

1012. Roe Island, Suison Bay, California.—Some 2,500 feet of lumber was purchased, with which a platform was built under the dwelling and wharf.

1016. Point Reyes, on the western extremity of Point Reyes, Pacific Ocean, California.—A 35,000-gallon tank was erected to increase the water supply.

1017. Point Arena, seacoast of California.—This station is built upon a point extending into the ocean and subjected to the violence of the waves. Since the buildings were erected the sea has made great inroads on the land, until now the fog signal stands on a bluff connected to the rest of the station by a narrow tongue of land, and is in danger of being entirely cut off, if not destroyed. To prevent an accident of this character, it was determined to build a new fog-signal building about 125 feet back from the present signal and to install therein the existing apparatus. This work is now progressing under contract. Various repairs were made.

1018. Cape Mendocino, seacost of California.—The contractor for building the roadway, after beginning work, refused to carry it to completion. As his contract was without bonds it could not be enforced. The work is now being done by hired labor, and will soon be completed.

The keeper's dwelling was completed. The dwelling as rebuilt is one story and a half high, and affords less accommodation for keepers than the old building, which was two stories. There is, therefore, not sufficient room for all the keepers, one family being compelled to occupy the building formerly used as an oil house. The plans approved by the Board contemplated the construction of an additional cottage for the assistant keeper. It is estimated that a proper structure can be erected for $5,500, and it is recommended that an appropriation of that amount be made therefor.

1022. St. George Reef, on Northwest Seal Rock, off Crescent City, seacoast of California.—The framed blacksmith shop built on the pier was destroyed by the sea, and was rebuilt. The hoisting boiler was retubed. New wire guys for the hoisting derrick and a few fog-signal fittings were purchased and sent to the station.

REPAIRS.

During the fiscal year repairs and renovations more or less extensive were made at the following-named stations:

988. Point Hueneme, Cal.
989. Santa Barbara, Cal.
992. Piedras Blancas, Cal.
994. Point Pinos, Cal.
998. Point Montara, Cal.
1000. Point Bonita, Cal.
1002. Lime Point, Cal.
1004. Alcatrez, Cal.
1006. Oakland Harbor, Cal.
1020. Trinidad, Cal.
1021. Crescent City, Cal.

LIGHT-VESSELS.

—. San Francisco Harbor light-vessel, off San Francisco Bar, California.—By the act approved June 11, 1896, $40,000 was appropriated, and a contract was authorized not to exceed $80,000, for constructing, equipping, and outfitting complete for service a first-class steam light-vessel with steam fog-signal for this station.

The proper measures are being taken for its construction. It is estimated that $40,000, in addition to the amount already appropriated, will be needed to finish this vessel. Recommendation is made that this amount be appropriated therefor.

Twelfth District.

—. *Wreck of Blairmore light-vessel, San Francisco Bay, California.*—On the morning of April 9, 1896, the British ship *Blairmore*, at anchor about one-half mile off Potrero Point, San Francisco Bay, was capsized during a squall and sank in 6½ fathoms of water. As the wreck was in the fairway of vessels bound up or down the lower bay, and the hull was entirely submerged at high water, it was considered necessary to immediately mark the spot with a temporary light-vessel until the wreck could be properly buoyed. The schooner *Fourth of July* was engaged for this purpose, and at 4 p. m. the same day was anchored within 100 yards of the wreck, showing from sunset to sunrise every night two white lights placed about 30 feet above the water, and sounding a bell or blowing a horn to warn vessels during foggy weather. On April 13 two second-class nun buoys, red and black horizontal stripes, were placed one on each side and about 100 yards distant from the wreck, but owing to foggy weather the temporary light-ship was not removed until the next day at 3 p. m.

DAY OR UNLIGHTED BEACONS.

All the 46 unlighted and the 7 lighted beacons, used also as day marks, were cared for during the year.

Beacon No. 3, in San Pedro Harbor, and beacon No. 6, Redwood Creek, in San Francisco Bay, which were in bad condition, were rebuilt.

FOG SIGNALS OPERATED BY STEAM.

990. Point Conception, California.—The 12-inch steam whistles, in duplicate, were in operation some 167 hours, and consumed about 19 tons of coal.

991. San Luis Obispo, California.—The 10-inch steam whistles, in duplicate, were in operation some 884 hours, and consumed about 67 tons of coal.

993. Point Sur, California.—The 12-inch steam whistles, in duplicate, were in operation some 970 hours, and consumed about 88 cords of wood.

996. Año Nuevo Island, California.—The 12-inch steam whistles, in duplicate, were in operation some 752 hours, and consumed about 42 tons of coal.

997. Pigeon Point, California.—The 10-inch and one 12-inch steam whistles were one or the other in operation some 758 hours, and consumed about 58 cords of wood.

998. Point Montara, California.—The 12-inch steam whistles, in duplicate, were in operation some 783 hours, and consumed about 78 cords of wood.

999. Farallon, California.—The first-class steam siren, in duplicate, was in operation some 1,016 hours, and consumed about 65 tons of coal.

Twelfth District.

1000. Bonita Point, California.—The first-class steam siren, in duplicate, was in operation some 1,512 hours, and consumed about 119 tons of coal.

1002. Lime Point, California.—The 12-inch steam whistles, in duplicate, were in operation some 884 hours, and consumed about 86 tons of coal.

1005. Yerba Buena, California.—The 10-inch steam whistles, in duplicate, were in operation some 128 hours, and consumed about 13 tons of coal.

1010. East Brother Island, California.—The 12-inch steam whistle was in operation some 155 hours, and consumed about 13 tons of coal.

1016. Point Reyes, California.—The 12-inch steam whistles, in duplicate, were in operation some 1,194 hours, and consumed about 93 tons of coal.

1017. Point Arena, California.—This signal, consisting of one 10-inch and one 12-inch steam whistle, was in operation some 1,184 hours, and consumed about 118 cords of wood.

1019. Humboldt, California.—This signal, consisting of one 10-inch and one 12-inch steam whistle, was in operation some 877 hours, and consumed about 88 cords of wood.

1022. St. George Reef, California.—The 12-inch steam whistles, in duplicate, were in operation some 678 hours, and consumed about 37 tons of coal.

BUOYAGE.

The buoyage of the district is in excellent condition and all buoys are in place.

The following-named changes have taken place:

On August 7, 1895, the Noonday Rock bell buoy went adrift and was picked up by a tugboat 8 miles southwest of the South Farallon and delivered at San Francisco. It was replaced in its old position on August 13.

On August 26, 1895, the obstruction buoy formerly marking Anita Rock, San Francisco Bay, was replaced by a first-class nun buoy, painted red and numbered 4, in 66 feet of water.

On October 3, 1895, a first-class nun buoy (Southeast Mooring buoy), used for mooring the tender off St. George Reef station, went adrift and was picked up by the tug *Ranger* 7½ miles from Humboldt Bay, California. The buoy was delivered on the wharf in Eureka.

On December 23, 1895, Packard Rock buoy, third-class nun, red and black horizontal stripes, was placed in 15 feet of water as an additional aid to navigation to mark Mission Bay Rocks, San Francisco Harbor.

On January 14, 1896, the Noonday Rock bell buoy again went adrift after being down a little over four months. The spare bell buoy, improved type, was placed in the old position on January 30, 1896. The drifting buoy, with 26 fathoms of chain, was finally recovered by the *Madroño* 2 miles south of Cape Mendocino.

On April 1, 1896, the three iron buoys in Mission Bay, San Francisco Harbor, were replaced by second-class spar buoys, as the grain barges were constantly running over and misplacing the iron buoys.

On April 13, 1896, two second-class nun buoys, red and black horizontal stripes, were placed temporarily to mark the wreck of the British ship *Blairmore*. These buoys were discontinued on June 22, 1896, the wreck having been moved into shallow water.

On May 2, 1896, the Crescent City whistling buoy went adrift, was picked up by the steamer *Crescent City*, towed into the harbor, and hoisted onto the wharf. This buoy was replaced on June 18, 1896.

On May 19, 1896, the three second-class spar buoys marking the channel from San Diego to National City, Cal., were removed, being no longer needed.

On June 4, 1896, a bell buoy, attached to a first-class can buoy, red and black horizontal stripes, was placed in 111 feet of water to mark Mile Rocks, entrance to San Francisco Bay.

The following-named new buoys were established during the past fiscal year:

On December 23, 1896, Packard Rock buoy, San Francisco Bay.
On April 13, 1896, wreck of the *Blairmore*, north buoy, San Francisco Bay.
On April 13, 1896, wreck of the *Blairmore*, south buoy, San Francisco Bay.
On June 4, 1896, Mile Rock bell buoy, San Francisco entrance.
On June 4, 1896, Mile Rock can buoy, San Francisco entrance.

The following-named buoys were discontinued as no longer of use as aids to navigation:

On May 19, 1896, San Diego Harbor spar buoy, red.
On May 19, 1896, San Diego Harbor spar buoy, black.
On May 19, 1896, San Diego spar buoy, red.
On June 22, 1896, wreck of the *Blairmore*, north buoy, San Francisco Bay.
On June 22, 1896, wreck of the *Blairmore*, south buoy, San Francisco Bay.

WHISTLING BUOYS IN POSITION.

San Diego Bar.—A second-class whistling buoy, painted black and white perpendicular stripes, and marked "S. D."

Point Arguello.—A second-class whistling buoy, painted red, and marked "Pt. A."

Point Buchon.—A second-class whistling buoy, painted red, and marked "Pt. B."

Piedras Blancas.—A second-class whistling buoy, painted red, and marked "P. B."

Point Pinos.—A second-class whistling buoy, painted red, and marked "Pt. P."

Santa Cruz.—A second-class whistling buoy, painted black and white perpendicular stripes, and marked "S. C."

Twelfth District.

San Francisco Bar.—A first-class whistling buoy, painted black and white perpendicular stripes, and marked "S. F."

Saunders Reef.—A second-class whistling buoy, painted red, and marked "S. R."

Fort Bragg Landing.—A second-class whistling buoy, painted black and white perpendicular stripes, and marked "F. B."

Blunts Reef, Cape Mendocino.—A second-class whistling buoy, painted red, and marked "Blunt."

Humboldt Bar.—A second-class whistling buoy, painted black and white perpendicular stripes, and marked "H. B."

Crescent City.—A second-class whistling buoy, painted black and white perpendicular stripes, and marked "C. C."

DEPOT.

Yerba Bueno Islands.—Ten piles were driven along the front of the crib and the stringers and chocks were fastened to them. Three piles were driven in the south cluster and three others as mooring piles. Various repairs were made.

By the sundry civil act approved June 11, 1896, $30,000 was appropriated to construct a new wharf here. The work will be taken in hand as soon as practicable.

The keeper of the Yerba Bueno buoy depot was appointed a special deputy United States marshal, without pay, to serve only on Yerba Buena Island, for the protection of light-house property.

The structures at this light-house depot have lately been again menaced by fire, which, starting on the north side, was carried by the wind, and burned the grass and shrubbery over the entire island, being stopped just outside the light-house reservation by starting back fires. The water supply proved utterly inadequate to the emergency.

The following recommendation made in the Board's last two annual reports is therefore renewed:

> A pumping plant and a plant for increasing the water-storage capacity, with the object of supplementing the present water supply, is needed, as that now in use is inadequate to the needs of the station, and in case of fire would be of little use. The estimated cost of this improvement is $5,100. It is recommended that an appropriation of this amount be made for this purpose.

TENDER.

The Madroño.—This iron screw steamer was employed in attending to the buoyage, supply, and inspection of the district. She changed or replaced 131 buoys, painted or repaired 18 beacons, landed some 830 tons of coal at 24 stations, delivered supplies at 35 stations, and conveyed the inspector to all the stations except Cape Mendocino and Humboldt, which are visited by other means of conveyance, making 171 inspections during the year. In doing this she steamed 10,214 miles upon a consumption of 885 tons of bituminous coal. The crew was employed at the depot 2,535 hours, and the vessel was laid up 57 days for necessary repairs to hull and machinery. On October 25, 1895, the vessel was docked at the Union Iron Works, San Francisco, and after a thorough cleaning was given two coats of Holzapfel's international composition. While out of water a few bolts were renewed in the bilge strainer, but no other repairs were found necessary.

The Madroño's steam launch.—On January 8, 1896, a contract was made for a first-class steam launch. Upon its completion it was thoroughly tested, and being found satisfactory in all particulars it was accepted. Its hull, which is of white oak and white cedar, is 32 feet long, 8 feet beam, and 5 feet 1 inch from the top of coaming. The engine is a compound upright with reverse link motion; the cylinders are of 4 and 8 inch diameter, with 6-inch stroke of piston. The boiler is a return tubular, 60 inches long and 48 inches diameter.

Steam launch Hazel.—This launch was taken out on the ways and was scraped, cleaned, and painted. Repairs were made to the boiler.

THIRTEENTH DISTRICT.

This district extends from the boundary between California and Oregon to the northern boundary of the United States, and includes Alaska. It embraces all aids to navigation on the seacoasts of Oregon and Washington, and the United States waters of the Strait of Juan de Fuca, Washington Sound, and the Gulf of Georgia, and on the tidal waters tributary to the sea, strait, sound, and gulf between the limits named, together with those on Alaskan waters.

Inspector.—Commander Oscar W. Farenholt, United States Navy, until June 30, 1896; since then Lieut. Commander John P. Merrell, United States Navy.

Engineer.—Maj. James C. Post, Corps of Engineers, United States Army, until December 17, 1895; since then Capt. Walter L. Fisk, Corps of Engineers, United States Army.

There are in this district—

Light-houses and beacon lights, including 99 post lights	118
Light-vessel in position	1
Day or unlighted beacons	42
Fog signals operated by steam or hot-air engines	11
Fog signals operated by clockwork	5
Whistling buoys in position	8
Bell buoys in position	4
Other buoys in position	284
Steamer *Manzanita*, buoy tender, and for supply and inspection	1
Steamer *Columbine*, for construction and repairs	1

LIGHT-STATIONS.

1024. Coquille River, seacoast of Oregon.—The contractors for the erection of the buildings at this station finished their work October 7, 1895. The lighting apparatus, fog-signal machinery, etc., were put in place, and as everything was in readiness the station went into commission February 29, 1896. Since that date it has been continuously in service. In order to complete the station a good water supply is to be provided, and an oil house, a suitable landing place for supplies, fences, etc., are to be built.

1025. Cape Arago, on a small island at the western end of Cape Arago, seacoast of Oregon.—The contractor for the erection of the fog-signal building, tower, dwellings, etc., was greatly delayed, owing to the isolated condition of the station, difficulty in landing supplies, and the wrecking of a schooner load of his material. An extension of four

months was therefore granted for the completion of the contract. He completed his work May 14, 1896. The contractors for furnishing the fog-signal apparatus finished their work June 22, 1896. The machinery will be put in place at once. A number of years ago a boathouse was built on the sand spit at the mouth of South Slough, Coos Bay, for the use of the keepers at this station, but it was undermined and destroyed by changing currents and shifting of the slough, caused by the heavy swells coming from the ocean. As the work on the jetty on the north side of the entrance to Coos Bay has progressed, the wave action on the spit has ceased and the course of the slough is now supposed to be permanent. A new boathouse was built near the original site. The wagon road leading from South Slough, an arm of Coos Bay, 3 miles away, was repaired by felling trees so as to permit the sunlight to shine upon it, changing grades, digging side ditches, putting in culverts, building two small bridges, making 224 feet of corduroy road and 600 feet of new road, and draining off the numerous pools of water so as to make the road serviceable. A survey was made with a view of building a bridge between the island and the mainland, and a plan for the bridge is being prepared.

—. *Coos Bay lights, Oregon.*—The sundry civil appropriation act approved June 11, 1896, appropriated $500 for establishing post and range lights at Coos Bay, Oregon. The proper measures will be taken for beginning this work at an early day.

1026. Umpqua River, seacoast of Oregon.—In the case of the United States *v.* Smith & Burton and their bondsmen, which grew out of the failure of that firm to fulfill their contract of September 17, 1891, for the erection of the keeper's dwelling, barn, etc., at this station, and the subsequent reletting of the work at a higher figure, judgment for the sum of $4,000, the full amount of the bond, has been obtained, but up to the present time this judgment is still unsatisfied. Various repairs were made.

1033. Yaquina Head, Oregon.—Two small furnaces were put in. The barn being too small for the accommodation of the wagons, etc., a wagon shed was built. Various repairs were made.

1034. Cape Meares, south of Tillamook Bay, seacoast of Oregon.—The wagon road leading from the station to the Hodgdon County road was put in repair by leveling the roadbed, removing trees and roots, making ditches, and putting on necessary gravel. Before this road can be put in good condition it will be necessary to cut away the timber on the south side for about 3 miles, to permit the sunlight to shine upon it. The timber along the road leading from the Hodgdon County road to Tillamook River should be cut away. Various repairs were made.

1035. Tillamook Rock light and fog-signal station, 18 miles south of the entrance to the Columbia River, seacoast of Oregon.—A new boiler for the hoisting engine was purchased and put in place. The top and face of the rock on the west and southwest of the fog-signal building was covered with a coating of cement and well rammed into the irregularities of the surface and made smooth, to prevent further disintegration of the rock and its breakage by storm waves. Various repairs were made.

The telegraphic cable connecting the rock with the beach was laid, tested, and securely moored to the rock and beach. About 2 miles of the line already constructed between Fort Stevens and Seaside, Oreg., which had been destroyed, was repaired. The old route between Seaside and Indian Town Beach, from the trail along which it was formerly built, was changed to a new route by way of a county and toll road via Elk Creek to the same point. The written consent of the landowners over whose property the line passed was obtained. Communication was established between Fort Stevens and Tillamook Rock light-station, Oregon, on November 4, 1895. The line has been kept in repair since that date.

1037. Point Adams, Oregon.—The sundry civil appropriation act approved June 11, 1896, appropriated the sum of $11,000 for discontinuing this light and reestablishing it with a fog signal at or near the outer end of the wharf at Fort Stevens, near the mouth of the Columbia River, Oregon. The ditch along the road leading to the station was cleared out.

1038. Fort Stevens light and fog signal, mouth of the Columbia River, Oregon.—The sundry civil appropriation act approved June 11, 1896, appropriated the sum of $11,000 for discontinuing the Point Adams light and reestablishing it with a fog signal at or near the outer end of the wharf at Fort Stevens, near the mouth of the Columbia River, Oregon. The proper measures for beginning the above work will be taken at an early day.

1080. Willamette River light-station, at the mouth of the Willamette River, Oregon.—The contractor for the erection of this station completed his work October 30, 1895. The fog-signal machinery was put in place, and everything was in readiness; the station went into commission December 31, 1895. Since that date it has been continuously in service.

1093. Cape Disappointment, seacoast of Washington.—A concrete retaining wall was made around the base of the tower and workroom in place of the old wooden bulkhead, which was decayed and in a dangerous condition. A new footwalk was built from the dwelling to the road below. Various repairs were made.

1094. North Head, entrance to Columbia River, Washington.—On July 15, 1895, bids were opened for the construction of a wagon road leading from the station to the target grounds at Fort Canby. The lowest bid being so much in excess of the estimate, authority was granted to build the road by hired labor and the purchase of materials in open market. This road has been completed with the exception of covering it with broken rock, the funds available not being sufficient for that purpose. Drawings and specifications for the construction of this station were made. Advertisement was made for bids, to be opened August 3, for furnishing the metal work and for erecting the station.

1096. Grays Harbor, seacoast of Washington.—On December 16, 1895, $500 was paid into the registry of the United States circuit court for the district of Washington, western division, in accordance with the decree of the court rendered October 1, 1895, condemning the land for this station.

Test borings were made upon the proposed site of the tower, and a good foundation was found. The outline drawings for the structures to be built were made. The general drawings for the tower, dwellings, barn, oil houses, etc., were finished. The details for the stonework of the tower are well under way, and the preparation of the specifications has been begun.

1097. Destruction Island light and fog-signal station, seacoast of Washington.—Under date of May 16, 1896, authority was granted to build six rooms and a woodshed on the north side of the assistant keeper's dwelling. On May 27, 1896, the workmen and the material were shipped to the station, and active operations were begun. Owing to the late date, it was impossible to complete the work at the end of the fiscal year. The structure is boarded on the sides, the roof is shingled, the floors are laid, both upstairs and down are lathed, the first coat of plastering is put on the first floor, the basement is finished, including the cement floor, and connections are made with the main sewer. The work will be completed in July, 1896. Various repairs were made.

1102. New Dungeness light and fog-signal station, Strait of Juan de Fuca, Washington.—The following recommendation made in the Board's last annual report is renewed:

> The dwellings erected at this station are arranged for the accommodation of two families and one single man; but as there are four keepers employed, and sometimes three of them with families, there is insufficient accommodation, and a new dwelling is urgently needed. The estimated cost of a suitable building, cistern, outhouse, etc., for this station is $4,000.

1103. Smith Island, Puget Sound, entrance to Admiralty Inlet, Washington.—A new boathouse, with a foundation 4 feet high and boat ways 180 feet long, was built. Various repairs were made.

1107. Marrowstone Point post light, Admiralty Inlet, Washington.—The contractors for the erection of this station finished their work March 13, 1896. The fog-signal machinery was put in place, and, as everything was in readiness, the station went into commission on April 7, 1896. Since that date the station has been continuously in service.

1109. Point No Point light and fog-signal station, Puget Sound, Washington.—The following recommendation made in the Board's last two annual reports is renewed:

> It appears that the present fog bell at Point No Point does not satisfy the needs of the service. It is recommended, therefore, that a first-class fog signal be installed

in place of the bell. It is estimated that this can be done for $6,000, and the Board recommends that an appropriation of this amount be made therefor.

1112. Battery Point post light, Puget Sound, Washington.—The following recommendation made in the Board's last annual report is renewed:

> The establishment of a fog signal at this point is strongly urged. It is estimated that a fog bell, with suitable dwelling, grounds, etc., could be erected for $6,000, and it is recommended that an appropriation of this amount be made therefor.

1114. Robinson Point post light and fog signal, Puget Sound, Washington.—The work of filling in the swampy ground behind the bulkheads with dirt to the level of the surrounding grounds which was in progress at the end of the last fiscal year was finished on August 10, 1895. The contractor for furnishing and placing 350 cubic yards of rough stone along the bulkheads, to protect them from the high seas, completed his work August 8, 1895.

1115. Point Brown post light, Puget Sound, Washington.—The following recommendation made in the Board's last annual report is renewed:

> In addition to the stake light at this important turning point of the numerous water crafts plying between Tacoma and points down the sound, a fog signal is urgently required. It is estimated that a bell struck by machinery could be erected, together with the necessary buildings, dwellings, etc., for about $6,000, and it is recommended that an appropriation of this amount be made therefor.

—. *Post lights in Puget Sound and its adjacent waters, the Columbia and Willamette rivers, Yaquina Bay, and Sitka Harbor, Alaska.*—These lights are efficient aids to navigation in these inland waters. With the exception of the lights, inaccessible to the tenders, near Laconner, Wash., they were all inspected, and all the stakes, gallows frames, and beacons were repaired and painted. The keepers have done their work in a satisfactory manner.

REPAIRS.

Repairs were made at the following-named stations:

1023. Cape Blanco, Oreg.
1027. Heceta Head, Oreg.
1075. Warrior Rock, Oreg.
1099. Cape Flattery, Wash.
1104. Point Wilson, Wash.
1105. Admiralty Head, Wash.
1109. Point No Point, Wash.
1111. West Point, Wash.
1141. Turn Point, Wash.
1142. Patos Islands, Wash.

LIGHT-VESSELS.

1036. Columbia River light-vessel, No. 50, Pacific Ocean, off the Columbia River Bar, Washington.—The ship, lights, and fog signal are in good order and condition, except the boilers, which need new tubes.

1098. Umatilla Reef light-vessel, Pacific Ocean, off the Strait of Juan de Fuca, Washington.—This vessel is being built. An appropriation of $37,000 was made by the act approved June 11, 1896, for completing the construction of this vessel.

Thirteenth District.

DAY OR UNLIGHTED BEACONS

The day beacons were thoroughly renovated, and in some instances rebuilt. All are in good order and condition.

FOG SIGNALS OPERATED BY STEAM OR HOT AIR.

1024. Coquille River, Oregon.—The Daboll trumpet established February 29, 1896, was in operation some 99 hours, and consumed about one-fourth of a ton of coal.

1035. Tillamook Rock, Oregon.—The first-class siren, in duplicate, was in operation some 634 hours, and consumed about 10 tons of coal.

1036. Columbia River light-vessel, No. 50, Washington.—The 12-inch steam whistle was in operation some 920 hours, and consumed about 58 tons of coal.

1097. Destruction Island, Washington.—The first-class steam siren, in duplicate, was in operation some 1,855 hours, and consumed about 31 tons of coal.

1099. Cape Flattery, Washington.—The 12-inch steam whistle, in duplicate, was in operation some 4,229 hours, and consumed about 70 tons of coal.

1102. New Dungeness, Washington.—The 12-inch steam whistle was in operation some 1,919 hours, and consumed about 64 tons of coal.

1104. Point Wilson, Washington.—The 12-inch steam whistle was in operation some 2,840 hours, and consumed about 53 tons of coal.

1111. West Point, Washington.—The Daboll trumpet was in operation some 888 hours, and consumed about 7 tons of coal.

1114. Robinson Point, Washington.—The 12-inch steam whistle was in operation some 2,089 hours, and consumed about 27 tons of coal.

1141. Turn Point, Washington.—The Daboll trumpet was in operation some 929 hours, and consumed about 3 tons of coal.

1142. Patos Islands, Washington.—The Daboll trumpet was in operation some 755 hours, and consumed about 5 tons of coal.

BUOYAGE.

Seventeen bouys were established, four were discontinued, and every buoy, as far as practicable, was changed twice during the year. The eight whistling and four bell buoys are all in working order and the buoyage is in good condition.

DEPOT.

Tongue Point, Columbia River, Oregon.—The foundation of the water tank used for supplying the station for domestic and fire purposes had become so rotten and was settling so that the bottom of the tank was in danger of being destroyed. A new foundation of brick was built. The wharf and piling near and under part of the middle storehouse, which was badly decayed and in an unsafe condition, was repaired. Two extra fender piles were driven in the cluster at the west corner of the wharf to prevent steamers from striking against the wharf. A concrete foundation extending to the ground was placed under the boiler in the pump house. Eave troughs of heavy galvanized iron were put on the middle and inner storehouses. Small repairs were also made to the dwelling.

The recommendation was made last year to erect two inexpensive oil houses, such as are used at various light-stations, on solid ground at the end of the wharf. The danger from fire to the mineral oil stored in the wooden building on the wharf is very great and is occasioned by the cinders coming from passing river steamers which use wood for fuel It is proposed to connect the depot wharf with the oil houses by a track over which a hand car can be propelled. It is estimated that these improvements can be made for $5,000, and it is recommended that an appropriation of this amount be made therefor.

TENDERS.

The Manzanita.—This wooden screw steamer is in good order. During the past year she steamed some 10,988 miles on about 871 tons of coal. During the spring of 1896 her boiler was retubed and thoroughly patched, and minor repairs were made to both hull and engine. An electric-light plant is now being installed on board. During the year she was under steam 302 days and 13 hours; she landed 276 tons of coal at light-stations; she was employed at the depot 43 days; she set, changed, or renovated 113 buoys, and renovated 2 beacons and day marks; she established 2 new aids; she delivered 356 tons of freight and 73,071 feet of lumber, and she laid the telegraph cable between Tillamook Rock light-station and the shore.

The Columbine.—This steel screw steamer is in good order. During the past year she steamed some 13,215 miles on about 1,302 tons of coal. In October, 1895, she was docked and received a new propeller. During March the vessel was at Portland undergoing repairs, principally to her boilers, in which about 100 stay bolts were renewed. She was employed at the depot about 34 days, landed 275 tons of coal at light-stations, changed and renovated 185 buoys and renovated 70 beacons and day marks, established 3 new aids, and landed 80,000 pounds of general material and 300 feet of lumber for construction and repair.

FOURTEENTH DISTRICT.

The Fourteenth district extends on the Ohio River from Pittsburg, Pa., to Cairo, Ill., 966 miles; on the Tennessee River, 255½ miles, and on the Great Kanawha, 73½ miles; in all, a distance of 1,295 miles, and embraces all the aids to navigation within these limits.

Inspector.—Lieut. Commander William W. Gillpatrick, United States Navy.

Engineer.—Lieut. Col. Amos Stickney, Corps of Engineers, United States Army, until February 6, 1896; since then Maj. William H. Heuer, Corps of Engineers, United States Army.

There are in this district—

Post lights	495
Floating lights	34
Light-keepers	486
Steam tender *Goldenrod*, for supply and inspection	1
Number of day marks	2

During the year there were three post lights and three day marks established and two post lights discontinued.

On account of the almost unprecedented continuance of low water during the year, but two inspection and supply trips were made, and on neither was it possible to proceed higher than Waterloo, on the Tennessee River, on account of low water on the shoals. The lights above Waterloo were supplied there. On the first trip for the year the lights bove Charleston, W. Va., were supplied by the courtesy of the local cket company, there not being sufficient water for the tender to visit em. On the last trip, which ended June 17, new posts were set and pairs were made as required, and all posts were painted; trees and sh interfering or likely to interfere with lights were cleared away, d the ranges of many lights were increased. Sufficient supplies were t with the keepers to insure the proper service of the lights through probable continuance of low water. Light-keepers have, in the n, performed their duties in a satisfactory manner. Masters and ts have rendered valuable assistance by recommending changes reporting delinquencies, and they speak in complimentary terms he service of the Light-House Establishment in this district.

Fourteenth District.

RECAPITULATION.

Total number of lights	52
Number of post lights	49
Number of float lights	3
Number of day marks	[illegible]
Number of light keepers	48
Number of post lights established	[illegible]
Number of post lights discontinued	[illegible]
Number of day marks established	3

TENDER.

The Goldenrod.—This steel stern-wheel steamer was taken out of the water for repairs to the woodwork of the hull, and also to allow of her being painted. Slight repairs were made to the rudders and bottom plating. During the low-water season a new wheel was built. On November 27, 1895, while engaged in supplying lights, the tender was so seriously injured by a hidden obstruction that she had to return to Cincinnati for repairs. The tender moved 10 posts, reset 75 posts, cut 1,715 trees, cleared 41 acres of brush, distributed 16,973 gallons of oil, steamed about 5,550 miles, and in doing so consumed some 710 tons of coal.

The map of this district, prepared in the Board's office from data compiled by the district engineer, and which appeared for the first time in the Board's report for 1895, has been revised and brought up to date.

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FIFTEENTH DISTRICT.

The Fifteenth district extends on the Mississippi River from the head of navigation to Cairo, Ill., on the Missouri River, to Kansas City, Mo., and on the Illinois River from La Salle to its mouth, being in all a distance of 1,582½ miles, and embraces all the aids to navigation within these limits.

Inspector.—Lieut. Commander Abraham B. H. Lillie, United States Navy.

Engineer.—Lieut. Col. Charles R. Suter, Corps of Engineers, United States Army, until January 14, 1896; since then Lieut. Col. Amos Stickney, Corps of Engineers, United States Army.

Number of lights	525
Number of keepers	338
Number of channel marks	60
Number of trees cut down	1, 016
Number of acres cleared	11⅛
Number of gallons of oil used	14, 491½
Number of lights established	32
Number of lights discontinued	31
Steamer *Lily*, for supply and inspection	1

The efficiency of the service was well maintained. The keepers generally were attentive to their duties, and the number of complaints received of lights out or burning dimly shows a marked improvement over the usual yearly record, and is more than 50 per cent less than that of either of the two previous years. A few stations and parts of outfits were lost in the Lower Mississippi during the sudden rise in December, the occasion calling for the greatest care and watchfulness on the part of the keepers; and that the loss was not greater, under the circumstances, is very much to their credit. No damage to stations by trespassers was reported.

Above St. Louis the lights were extinguished and started as navigation closed and opened, but below they were kept burning all winter, as there was little trouble from ice in this part of the district, and there was no interruption to the river traffic.

TENDER.

The Lily.—This wooden side-wheel steamer is in good condition except the hull. A quantity of outside planking, a number of frames, and a portion of the stem are rotten. During the year some repairs were made to the machinery and boiler. New smoke pipes for the galley, workshop, and laundry were also furnished. Nine round trips of the district were made, two on the Upper Mississippi, five on the Lower Mississippi, one on the Illinois River, and one on the Missouri River. On the April trip to St. Paul, by courtesy of the engineer officer in charge, the tender was placed in the Government dock at Keokuk, and some slight repairs were made to her bottom. From November 28, 1895, to March 1, 1896, the tender was laid up in winter quarters at Paducah, Ky., with reduced crew.

The boating season of 1895 was one of extremely low water. The spring rains had but little effect upon the rivers, and the stage, which was low at the beginning, became gradually less as the season advanced The result was that through navigation to St. Paul was suspended about the middle of August and to Keokuk the first part of November. The main volume of business was done by local packets running to nearby points. In the latter part of December a sudden rise took place in the Missouri River and its tributaries, which was directly felt in the Lower Mississippi, and the river at St. Louis rose 22 feet in less than four days, but it rapidly subsided. The present season opened with a good stage of water throughout the district, which has continued without interruption. The usual spring flood occurred during May, the river coming to a stand on the 26th, at 28 feet on the St. Louis gauge, or 2 feet below the danger point. On May 27 a violent storm swept over St. Louis, which was destructive to property on shore and afloat and caused much loss of life. The tender was in the locality at the time, but she escaped without injury, as she was somewhat out of the track of the storm center and was secured close to and under the lee of a high bluff, which afforded adequate protection. During the year she steamed 6,042 miles, and consumed about 956 tons of coal.

The map of this district, prepared in the Board's office from data compiled by the district engineer, and which appeared for the first time in the Board's report for 1895, has been revised and brought up to date.

SIXTEENTH DISTRICT.

The Sixteenth district extends on the Mississippi River from Cairo, Ill., to New Orleans, La., and on the Red River a distance of 8 miles, being in all a distance of 1,009 miles, and embraces all the aids to navigation within these limits.

Inspector.—Commander Andrew J. Iverson, United States Navy, to June 30, 1896; since then Commander W. T. Burwell, United States Navy.

Engineer.—Lieut. Col. Charles R. Suter, Corps of Engineers, United States Army, to January 14, 1896; since then Lieut. Col. Amos Stickney, Corps of Engineers, United States Army.

In this district there are—

Post lights	360
Light-keepers	335
Steamer *Joseph Henry*, for supply and inspection	1

There are in the Sixteenth district 360 post lights cared for by 335 keepers, an increase of one post light and one keeper in the past 12 months.

The efficiency of the district was well maintained and the work of the keepers was satisfactory.

Complete inspections of the district, during which each post light in he district was visited, were made each quarter during the year, as equired by the regulations.

During the year 1,463 visits were made to post lights, which were inspected, painted, paid, and supplied; 21 were established, 18 were discontinued, and 181 were moved; 76 keepers were dismissed and 76 were appointed. Some 820 trees over 4 inches in diameter were felled; 1⅝ acres of willows, brush, etc., were cleared; 13,957 gallons of min-ral oil and 58 gross of wicks were issued to the keepers.

OFFICE WORK.

The office work of the district consisted of the keeping of the accounts f 399 post lights, including 18 post lights discontinued during the year, e preparation of the vouchers, representing disbursements aggregating $5,309.66, making required reports and returns, and the maintenance official and routine correspondence.

Sixteenth District.

TENDER.

The Joseph Henry.—During the year this wooden side-wheel steamer conveying the inspector steamed some 8,565 miles, and consumed about 1,062 tons of coal. She received some incidental repairs to her machinery. The hull of the boat is now in such condition as to demand immediate attention, and not more than one more inspection trip should be made till she should be hauled out of the water. She was under steam, exclusive of 252 days steam in the donkey boiler, 114 days and 9 hours. The machinery was in motion, exclusive of the electric-light engine, 57 days and 2 hours.

The map of this district, prepared in the Board's office from data compiled by the district engineer, and which appeared for the first time in the Board's report for 1895, has been revised and brought up to date.

CONCLUSION.

The Board feels warranted in reporting, in conclusion, that the general efficiency of the service has been maintained throughout the year at as high a standard as was practicable with the means available.

J. G. WALKER,
Rear-Admiral, United States Navy,
Chairman.
GEO. F. F. WILDE,
Commander, United States Navy,
Naval Secretary.
JOHN MILLIS,
Captain, Corps of Engineers, United States Army,
Engineer Secretary.

The SECRETARY OF THE TREASURY.

INDEX.

A.

Page.

- Absecon, N. J 75
  - depot 82
- Adams, Henry M., major, Corps of Engineers 5
- Aids to navigation, appropriations made for, 1896-97 26
  - appropriations asked for, 1897-98 33
  - statistics of, to June 30, 1896 7
  - maintained on June 30, 1896 .... 7, 25
  - temporary changes in 19
- Alaskan waters, buoyage 7
- *Amaranth*, tender, Ninth and Eleventh districts 117, 127, 140, 154
  - steam launch of 117, 140
- Amelia Island range, Florida 100
- Ames Ledge, Maine 38
- Anchorage buoys, harbor of New York, appropriation asked 29
- Annapolis depot, Maryland 93
- Año Nuevo Island, seacoast of California 158
- Apalachicola Bay, Florida 33, 107
  - dredged channel, Florida 107
- Appropriations made for 1896-97 26
  - recommended for 1897-98 27-34
  - for supplies 27
  - repairs, etc 28
  - keepers' salaries 28
  - light-vessels 28
  - buoyage 29
  - lighting rivers 30
  - fog signals 29
  - survey of sites 32
  - oil houses 32
  - flags at light-stations 32
- Appropriations, special 26, 33
- *Arbutus*, tender, Seventh and Eighth districts 106, 112, 115
- *Armeria*, supply steamer 54, 71
- Ashtabula, Ohio 131
- Assateague, Virginia 77
- Atlanta, Ga., Cotton States and International Exposition 31
- Automatic buoys. (*See* Bell buoys; Whistling buoys.)
- Avery Rock, Machias Bay, Maine 40
- *Azalea*, tender, Second light-house district 44, 53

B.

Page.

Bailey Harbor range, Wisconsin 121
Baker Island, Maine 40
Ballards Reef light-ship, No. 63, Detroit River, Michigan 137
new light-ship and float lights, Detroit River, Michigan 34, 136
Baltimore, Md 87
Barataria Bay, Louisiana 114
Barnegat, N. J 77
Barnwell Place beacon, South Carolina 99
Bar Point light-ship, No. 59, Lake Erie 136
Bartlett, John R., captain, United States Navy 3, 5
Bartlett Reef light-ship, No. 13, Connecticut 61
Bass Harbor Head, Maine 40
Battery Gladden, Alabama 114
Battery Point, Washington 34, 170
Bayfield, Lake Superior, Wisconsin 149
Bayou St. John, Louisiana 113
Beacons (day or unlighted) in First district 35, 40
Second district 44, 48
Third district 54, 63
Fourth district 75, 79
Fifth district 84, 92
Sixth district 96, 103
Seventh district 106, 109
Eighth district 112
Eleventh district 140
Twelfth district 156, 161
Thirteenth district 166, 171
Fourteenth district 173, 174
Fifteenth district 175
total number 7
Beacons (lighted) used as day marks, Twelfth district 156
Beacon lights, Currituck Sound and North River, North Carolina 88
North Landing River, Virginia 88
Rappahannock River, Virginia 85
Bear Island, Maine, buoy depot 43
Beaver Island Harbor, Michigan 118
Bell buoys in position 7, 25
established during the fiscal year 18
discontinued during the fiscal year 19
First district 35, 42
Second district 44, 52
Third district 54, 65
Fourth district 75, 80
Fifth district 84, 92
Sixth district 96, 103
Seventh district 106, 109
Eighth district 112, 115
Ninth district 117, 126
Eleventh district 140, 153
Twelfth district 156, 162
Thirteenth district 166, 171
Big Bay Point, Michigan 146
Big Sable, Michigan 146

Page.
Big Sodus, New York 129
Billingsport range, front, New Jersey 77
Bird Island, Massachusetts 46
Black Ledge, Connecticut 33, 55
Black River Pierhead, Ohio, range lights 132
Blairmore, wreck of, light-vessel, Twelfth district 161
Blake, Lucien I., Prof 62
Blakistone Island, Maryland 90
Blockade Shoal, North Carolina 33, 89
Bodie Island, North Carolina 87
Bolivar Point, Texas 113
Boon Island, Maine 33, 39
Boston Harbor light-ship, No. 54, Massachusetts 46
Boston, Mass., machine and lamp shop 52
Boundaries of First district 35
  Second district 44
  Third district 54
  Fourth district 75
  Fifth district 84
  Sixth district 96
  Seventh district 106
  Eighth district 112
  Ninth district 117
  Tenth district 128
  Eleventh district 140
  Twelfth district 156
  Thirteenth district 166
  Fourteenth district 173
  Fifteenth district 175
  Sixteenth district 177
Bowlers Rock, Virginia 85
Braddock Point, New York 130
Bramble, steam launch, Fifth district 84, 94
Brant Island Shoal, North Carolina 90
Brant Point, Massachusetts 46
Brazos River, Texas 114
Brazos Santiago, Texas 114
Brenton Reef light-ship, No. 11, Rhode Island 61
Bridgeport Breakwater, Connecticut 57
Bristol Ferry, Rhode Island 55
Browns Head, Maine 36
Brunswick Harbor ranges, Georgia 100
Buffalo Breakwater, New York 136
Buffalo, N. Y 136
Buffalo, N. Y., depot 138
Bull Bay, South Carolina 98
Buoyage, appropriation asked for expenses 29, 32
  statistics regarding 7
  of Alaskan waters 7
Buoys and appendages, General Light-House depot 70
Buoys in First district 35, 42
  Second district 44, 52
  Third district 54, 65
  Fourth district 75, 80

Page.
Buoys in Fifth district 84, 92
Sixth district 96, 103
Seventh district 106, 109
Eighth district 112, 115
Ninth district 117, 126
Tenth district 128, 137
Eleventh district 140, 153
Twelfth district 156, 162
Thirteenth district 166, 171
Alaskan waters 7
number maintained by Light-House Establishment 7, 25
special, established and discontinued 17, 19
anchorage, harbor of New York 29
bell, number in position 7, 25
ice, in Second district 44
Fourth district 75
gas, number in position 7
changes in 17, 18
electric, number in position 7, 25
whistling, number in position 7, 25
electric, Third district 65, 66
Buoy depots. (*See* Depots.)
Burlington Breakwater, Vermont 60
Burnt Coat Harbor, Maine 33, 36
Burnt House Pier post light, Thames River, Connecticut 56
Burnt Island, Maine 38
Bush Bluff Shoal light-ship, Virginia, *Holly* as relief 91
Butler Flats, Massachusetts 46

C.

Cactus, tender, Third district 54, 73
Caldwell, Eugene W 62
Calling devices for sea telephone 62
Calumet Pierhead, Illinois 120
Cape Ann, Massachusetts 44
Cape Arago, Oregon 166
Cape Blanco, Oregon 170
Cape Charles City range, Virginia 85
Cape Charles, Virginia 85
light-ship, No. 49, Virginia 91
Cape Disappointment, North Head, Washington 168
Cape Elizabeth, Maine 33, 38
Cape Fear, entrance to Cape Fear River, North Carolina 33, 97
seacoast of North Carolina 96
Cape Fear River post lights, North Carolina 97
range lights for new dredged channel 33, 97
Cape Flattery, Washington 170
Cape Hatteras, North Carolina 87
beacon, North Carolina 87
Cape Henlopen, Delaware 77
Cape Lookout, North Carolina 97
Cape Lookout Shoals, North Carolina, light-ship for 33, 91
Cape May, New Jersey 33, 75
depot, New Jersey 82

Page.
Cape Meares, Oregon 167
Cape Mendocino, California 34, 160
Cape Romain, South Carolina 98
Cape San Blas, Florida 33, 107
Carlton Island, New York 128
Carrabelle River beacons, Florida 109
Castle Hill, Rhode Island 54
Castle Pinckney buoy depot, South Carolina 103
Cat Head (Grand Traverse), Michigan 34, 119
Cat Island, Mississippi 113
Catskill (West Flats) post light, New York 60
Cedar Key, Florida 107
Cedar Point, Maryland 87
Cedar Point, Sandusky Bay, Ohio 132
    buoy depot, Ohio 133
Chandeleur, La 113
Changes in personnel of Board 5
    district officers 5
Changes, temporary, in aids to navigation 19
Chapman Shoal, New York 34, 128
Characteristics of lights changed 14
    fog signals changed 15
Charleston light-ship, No. 34, South Carolina 102
Charleston and Morris Island ranges, South Carolina 102
Cheboygan, Mich 143
Cheboygan River, Michigan, range 151
Chequamegon Point, Wisconsin 34, 149
Cherry Island range, Delaware 77
Chicago Pierhead, Illinois 123
Chicago River, Illinois 120
Chincoteague Inlet depot, Virginia 82
Choctawhatchee Bar, Florida 33, 108
Christiana, Del 77
Church Point, Michigan 144
Cleveland, Ohio 131
Cleveland east pier, Ohio 132
Cleveland west breakwater, Ohio 132
Clover, tender, Seventh and Eighth districts 106
Colchester Reef, Vermont 61
Columbia River light-ship, No. 50, Oregon 170
    post lights 170
Columbine, tender, Thirteenth district 166, 172
Communication between light-ships and shore, telephonic 62
Coney Island, New York 59
Conimicut, Rhode Island 55
Conneaut, Ohio 131
Conneaut Pierhead, Ohio 131
Conover beacon, New Jersey 61
Coos Bay lights, Oregon 167
Copper Harbor, Michigan 151
Coquille River, Oregon 166
Corner Stake, New Jersey 59
Cornfield Point light-ship, No. 48, Connecticut 61
Corona Shoal. (*See* Eleven-Foot Shoal light-ship.)

Page.

- Cotton States and International Exposition, Atlanta, Ga ... 31
- Coxsackie, N. Y ... 60
  - East Flats, New York ... 60
- Crabtree Ledge, Maine ... 40
- Crisps Point, Michigan ... 34, 145
- Crooked River, Florida ... 107
- Cross Ledge, New Jersey ... 77
- Cross-Over Island, New York ... 128
- Cross Rip light-ship, No. 5, Massachusetts ... 48
- Cuckolds, Maine ... 40
- Currituck Beach, North Carolina ... 87
- Currituck Sound, North Carolina ... 88

D.

- *Daisy*, steam launch, Third district ... 54, 73
- *Dahlia*, tender, Ninth district ... 117, 127
- Dark Hole range, St. Marys River, Michigan ... 143
- Day marks or unlighted beacons. (*See* Beacons.)
- Deep-Water Point range, front, New Jersey ... 76
  - rear, New Jersey ... 76
- Deer Island Thorofare, Maine ... 40
- Delaware Breakwater range, Delaware ... 77
  - east end, Delaware ... 77
  - west end, Delaware ... 76, 77
- Depot for Sixth district ... 33, 103
  - Ninth and Eleventh districts ... 34, 127
  - Tenth district ... 34, 138
- Depots in First district ... 43
  - Second district ... 52
  - Third district ... 68
  - Fourth district ... 82
  - Fifth district ... 93
  - Sixth district ... 103
  - Seventh district ... 109
  - Eighth district ... 115
  - Ninth district ... 126
  - Tenth district ... 138
  - Eleventh district ... 153
  - Twelfth district ... 164
  - Thirteenth district ... 171
- Destruction Island, Washington ... 169
- Detour, Mich ... 142
- Detroit depot, Michigan ... 153
- Detroit River, Bar Point, Michigan ... 136
- Devils Island, Wisconsin ... 149
- Devils Wharf post light, Connecticut River, Connecticut ... 56
- Dewey, George, captain, United States Navy ... 5
- Diamond Shoals, Outer, North Carolina ... 88
- Dice Head, Maine ... 40
- Discontinued lights, fog signals, and buoys ... 12, 14, 19
- Dog River Bar beacon, Alabama ... 113
- Dollers Point, Virginia ... 33, 85
- Doubling Point, Maine ... 38
  - range lights, Maine ... 38

Page.
Drift, schooner, temporary light-ship 91
Drum Point, Maryland 87
Dry Tortugas, on Loggerhead Key, Florida 106
Duffield, William W., general 3
Duluth range, Minnesota 151
Dumpling Rock, New Bedford Harbor, Massachusetts 46
Dunkirk, Dunkirk Harbor, New York 130
    Pierhead, New York 130

E.

Eagle Harbor, Michigan 148
    range, Michigan 151
Eagle Island, Maine 37
Eagle River, Michigan 148
East Brother Island, California 159
Eastern Point, Gloucester Harbor, Massachusetts 44
East Pascagoula River, Mississippi 114
Ecorse (Grassy Island), Mich 34, 135
Edgartown, Mass 46
Edgemoor, Del 33
    depot, Delaware 82
Egg Rock, Frenchmans Bay, Maine 40
Egg Rock, Massachusetts 46
Egmont Key, Florida 106
    buoy depot, Florida 110
    keeper's dwelling, Florida 33, 106
Eighth district, officers in charge of 4, 112
    statistics of 112
Electric and gas buoys in position 7, 25
Electric buoys, Gedney Channel, New York 54, 66
    Third district 54, 65
Electric communication with light-vessels 62
Eleven-Foot Shoal light-ship, No. 60, Green Bay, Michigan 124
Eleventh district, officers in charge of 4, 140
    statistics of 140
Employees, crews of light-ships, tenders, etc 7
Engineer, First district 3, 35
    Second district 3, 44
    Third district 3, 54
    Fourth district 3, 75
    Fifth district 3, 84
    Sixth district 4, 96
    Seventh district 4, 106
    Eighth district 4, 112
    Ninth district 4, 117
    Tenth district 4, 128
    Eleventh district 4, 140
    Twelfth district 4, 156
    Thirteenth district 4, 166
    Fourteenth district 4, 173
    Fifteenth district 4, 175
    Sixteenth district 4, 177
Erie buoy depot, Pennsylvania 138
Erie, outside of Erie Harbor, Pennsylvania 131

Page.
Erie range No. 1, entrance to Presqu'ile Bay, Pennsylvania 131
Escanaba, Mich 123
Esopus Island, New York 33, 59
Estimates, general 27-32
  buoyage 29, 32
  lighting of rivers 30, 32
  light-ships 28, 32
  fog signals 29, 32
  repairs of light-houses 28, 32
  salaries of keepers 28, 32
  survey of light-house sites 32
  supplies of light-houses 27, 32
  special 33
Execution Rocks, New York 57
Executive members of Board 3
Experiments with fog signals 49
Exposition, Cotton States and International, Atlanta, Ga 31
Fair Haven, Little Sodus Bay, New York 129
Fairport, Ohio 136
Falkner Island, Connecticut 56
Farallon Island, California 158
Fenwick Island Shoal light-ship, No. 52, Maryland 78
Fifteenth district, officers in charge of 4, 175
  statistics of 175
Fifth district, officers in charge of 3, 84
  statistics of 84
Finns Point, New Jersey 77
Fire Island, New York 61
Fire Island light-ship, No. 58, New York 33, 62
  new light-ship for 63
First district, officers in charge of 3, 35
  statistics of 35
Fishermans Shoal, Wisconsin 34, 122
Five-Fathom Bank light-ship, No. 40, New Jersey 78
  new light-ship for 78
Flag at light stations, appropriation for, asked 32
Float for gas tanks, Third district 74
Floating lights, Fourteenth district 173, 174
Float lights, new, for Ballards Reef, Michigan 136
Fog bells in Fourth district 77
Fog signals, appropriations for 26
  estimates for expenses of 29-32
  in First district 35, 41
    Second district 44, 49
    Third district 54, 64
    Fourth district 75, 80
    Fifth district 84, 91
    Sixth district 96, 103
    Eighth district 112, 115
    Ninth district 117, 124
    Tenth district 128, 137
    Eleventh district 140, 152
    Twelfth district 156, 161
    Thirteenth district 166, 171

Page.

- Fog signals, experiments with 49
  - number of 7
    - change in characteristics 15
    - discontinued 14
    - established during the year 11
    - operated by clockwork 7
      - steam or hot air 7
- Fort Gratiot, Mich 141
- Fort Mifflin Bar Cut, rear, New Jersey 77
- Fort Niagara, N. Y 130
- Fort Pickering, Mass 46
- Fort Point, Cal 158
- Fort Stevens, Oreg 168
- Fort Sumter, S. C 98
- Fort Tompkins, N. Y 59
- Fort Washington, Md 86
- Forty-Mile Point, Michigan 142
- Fourteen-Mile Point, Michigan 151
- Fourteenth district, officers in charge of 4, 173
  - statistics of 173
- Fourth district, officers in charge of 3, 75
  - statistics of 75
- *Fourth of July*, schooner, as light-vessel 161
- Franklin Island, Maine 40
- Frechette Point range, Hay Lake Channel, Michigan 144
- Frosts Point, New Hampshire 39
- Frying-Pan Shoals light-ship, No. 53, North Carolina 102

G.

- Galloo Island, New York 129
- Galveston light-ship, No. 28, Texas 115
  - Jetty, Texas 114
- *Gardenia*, tender, Third district 54, 72
- Gas buoys in position
  - Second district 44
  - Third district 54
  - Fourth district 75, 80
  - Eighth district 112
  - Tenth district 128, 137
- Gasparilla Island, Florida 109
- Gedney Channel electric buoys, New York 66
- Genesee, Lake Ontario, New York 129
- Georgetown, S. C 102
- *Geranium* tender, Second district 43, 44, 52
- Gladstone (Squaw Point), Mich 122
- Goat Island depot, Rhode Island 71
- *Goldenrod*, tender, Fourteenth district 173, 174
- Governors Island, New York 59
- Grand Haven Pierhead, Michigan 119
- Grand Lake post lights 112
- Grand Marais, Minn 150
- Grand Marais harbor of refuge, Michigan 34, 145
  - reservation, Michigan 146
- Grand Traverse (Cat Head), Michigan 34, 119

Page.
Grassy Island, Michigan 135
Grassy Island (Ecorse) range, Michigan 34, 135
  north channel range 135
  south channel range 134
Grassy Island, Wisconsin 122
Grassy Point (Manhattan) range lights, Ohio 134
Grays Harbor, Washington 169
Grays Reef light-ship, No. 57, Lake Michigan 124
Great Captain Island, New York 57
Great Duck Island, Maine 40
Great Round Shoal light-ship, No. 42, Massachusetts 47
Great Salt Pond Breakwater, Block Island, Rhode Island 55
Green Flats post light, New York 60
Green Island, Lake Erie, Ohio 133
Greens Ledge, Connecticut 33
Grosse Isle north channel range, Michigan 34, 134
  south channel range, Michigan 34, 134
Grossepoint beacon, Lake St. Clair, Michigan 140
  light-ship, No. 10, Michigan 151
Gull Rock, Lake Superior, Michigan 148
Gull Rocks, Rhode Island 60

H.

Hampton Roads, Virginia 85
Handkerchief light-ship, No. 4, Massachusetts 47
Hart Island, New York 33, 58
Hay Lake Channel, Michigan 144
Haze, tender, Tenth district 128, 138
Hazel, steam launch, Twelfth district 156, 165
Head of St. Marys River, Michigan 34, 145
Heceta Head, Oregon 170
Hell Gate, New York 61
Hen and Chickens light-ship, No. 2, Massachusetts 48
Hendricks Head, Maine 40
Heron Neck, Green Island, Maine 37
Hilton Head range, South Carolina 99
Hog Island depot, Maine. (*See* Little Diamond Island.)
Hog Island Shoal, Rhode Island 33, 55
  light-ship, No. 12, Rhode Island 61
Hog Island, Virginia 33, 84
  wharf and Dollers Point, Virginia 85
Holly, tender, as relief light-ship 84, 91
Horn Island, Mississippi 114
Horseshoe Reef, New York 136
Hudson City, N. Y 60
Hunting Island, South Carolina 98
Huron, Huron Harbor, Ohio 139
Huron Island, Lake Superior, Michigan 147

I.

Ice buoys (iron), Second district 44
  Fourth district 75, 80
Ice House post light, No. 3, Thames River, Connecticut 56
Illuminating apparatus, general light-house depot 70

Page.

Indian Point range, Michigan 143
Indian River post lights, Florida 101
Inside Passage beacon lights, Georgia and Florida 33, 100
Inspector of First district 3, 35
  Second district 3, 44
  Third district 3, 54
  Fourth district 3, 75
  Fifth district 3, 84
  Sixth district 4, 96
  Seventh district 4, 106
  Eighth district 4, 112
  Ninth district 4, 117
  Tenth district 4, 128
  Eleventh district 4, 140
  Twelfth district 4, 156
  Thirteenth district 4, 166
  Fourteenth district 4, 173
  Fifteenth district 4, 175
  Sixteenth district 4, 177
Iona Island, New York 33, 59
Ipswich, Mass 46
Isles of Shoals, New Hampshire 33, 39

J.

Jeffreys Hook, New York 33, 59
Jerrys Point, New Hampshire 39
Jessamine, tender, Fifth district 84, 94
John Rodgers, tender, Third district 54, 72
Jones Island, South Carolina 99
Jones Rocks beacon, New York 57
Joseph Henry, tender, Sixteenth district 177, 178
Juniper Island buoy depot, Vermont 71

K.

Keepers' salaries, appropriation asked 28, 32
  losses, reimbursement of 33, 34
Kennebec River, Maine 38
Kewaunee Pierhead, Wisconsin 34, 121
Key West, Fla 33, 106
  buoy depot, Florida 109

L.

Laborers in charge of post lights on rivers 7
  number of 7
Lake Chicot post lights 112
Lake George cribs, St. Marys River, Michigan 144, 151
  lower 144
  middle 144
  upper 151
Lake Huron light-ship, No. 61, Michigan 151
Lake St. Clair, Michigan 34, 141
  Twenty-Foot Channel, Michigan 140
Lamp shop, Eleventh district 154
La Pointe (*see* Chequamegon), Wis 34, 149

Page.

- Launch, naphtha, Fourth district, 75
  - steam, Third district, 54, 73
    - Fifth district, 84, 94
    - Sixth district, 105
    - Ninth district, 117
    - Eleventh district, 140
    - Twelfth district, 156, 165
- Launches (steam), number, 7
- Laurel Point, North Carolina, 88
- *Laurel*, tender, Seventh district, 106, 110
- Lazaretto Point, Maryland, 90
  - depot, Maryland, 33, 93
- *Leal*, naphtha launch, Fourth district, 75
- Libby Islands, Maine, 33, 36
- Lighted aids, total number, 7, 25
- Lighted buoys. (*See* Gas buoys; Electric buoys.)
- Light-House Board, executive members, 3
  - members, June 30, 1896, 3
  - officers, 3
  - changes in personnel of, 5
- Light-House Establishment, aids to navigation maintained by, 7
  - estimates for fiscal year 1897–98, 27–33
  - appropriations for fiscal year 1896–97, 26
- Light-houses and beacon lights, appropriations asked, 33
  - number in First district, 35
    - Second district, 44
    - Third district, 54
    - Fourth district, 75
    - Fifth district, 84
    - Sixth district, 96
    - Seventh district, 106
    - Eighth district, 112
    - Ninth district, 117
    - Tenth district, 128
    - Eleventh district, 140
    - Twelfth district, 156
    - Thirteenth district, 166
  - total number, 7
- Light-house districts, officers in charge of, 3
  - sites, survey of, appropriation asked, 32
- Lighting of rivers, appropriation asked, 30, 32
  - statistics regarding. (*See* Post lights.)
- Light keepers, total number, 7
  - salaries of, appropriation asked, 28, 32
  - reimbursement for losses, 33, 34
  - in Fourteenth district, 173, 174
    - Fifteenth district, 175
    - Sixteenth district, 177
- Lights and fog signals, alteration in, from July 1, 1895, to June 30, 1896, 14, 16
- Lights, change in location of, 16
  - characteristics changed, 14
  - discontinued from July 1, 1895, to June 30, 1896, 12
  - new, exhibited from July 1, 1895, to June 30, 1896, 8
  - number on rivers, 7

Page.

- Light-ships, new, constructed and under construction, 31
  - appropriation asked for expenses of, 28, 32
  - telephonic communication between, and shore, 62
  - six new, needed, 31
  - relief for Fourth and Fifth districts, 33, 78
  - for Five-Fathom Bank, New Jersey, 78
    - Overfalls, South Shoal, Delaware Bay, 33, 79
    - Fire Island, New York, 63
    - Cape Lookout Shoals, North Carolina, 33, 91
    - Martins Reef, Lake Huron, Michigan, 34, 151
    - Poe Reef, Michigan, 34, 151
    - new channel, Ballards Reef, Michigan, 34, 136
    - San Francisco Harbor, California, 34, 160
    - Umatilla Reef, Washington (No. 67), 170
  - *Holly*, on Bush Bluff, Virginia, 84, 91
  - in Second district, 44, 46
    - Third district, 54, 61
    - Fourth district, 75, 77
    - Fifth district, 84, 91
    - Sixth district, 96, 102
    - Eighth district, 112, 115
    - Ninth district, 117, 123
    - Tenth district, 128, 136
    - Eleventh district, 140, 151
    - Twelfth district, 161
    - Thirteenth district, 166, 170
  - total number, 7
  - in position, 7
  - for relief, 7
- Light-ship No. 1, Martins Industry, South Carolina, 102
  - 2, Hen and Chickens, Massachusetts, 48
  - 3, Shovelful Shoal, Massachusetts, 47
  - 4, Handkerchief, Massachusetts, 47
  - 5, Cross Rip, Massachusetts, 48
  - 6, Succonnesset Shoal, Massachusetts, 48
  - 7, Scotland, New York, 62
  - 9, relief, Second district, 48, 78
  - 10, Grossepoint, Michigan, 151
  - 11, Brenton Reef, Rhode Island, 61
  - 12, Hog Island Shoal, Rhode Island, 61
  - 13, Bartlett Reef, Connecticut, 61
  - 16, relief, Third district, 63
  - 19, relief, Third district, 63
  - 20, relief, Third district, 63
  - 23, Ram Island Reef, New York, 61
  - 28, Galveston, Tex, 115
  - 29, relief, Sixth district, 102
  - 34, Charleston, S. C, 102
  - 37, relief, Fourth district, 78
  - 39, relief, Second district, 48
  - 40, Five-Fathom Bank, New Jersey, 78
  - 41, Vineyard Sound, Massachusetts, 48
  - 42, Great Round Shoal, Massachusetts, 47
  - 43, South Pass, Louisiana, 115

Page.

- Light-ship No. 44, Northeast End, New Jersey 77
  - 45, Winter-Quarter Shoal, Virginia 78
  - 46, Smith Point, Virginia 91
  - 47, Pollock Rip, Massachusetts 46
  - 48, Cornfield Point, Connecticut 61
  - 49, Cape Charles, Virginia 91
  - 50, Columbia River, Oregon 170
  - 51, Sandy Hook, New York 62
  - 52, Fenwick Island Shoal, Maryland 78
  - 53, Frying-Pan Shoals, North Carolina 102
  - 54, Boston, Mass 46
  - 55, Simmons Reef, Lake Michigan 123
  - 56, White Shoal, Lake Michigan 123
  - 57, Grays Reef, Lake Michigan 124
  - 58, { Nantucket New South Shoal, Massachusetts 48
    - Fire Island, New York 33, 62
  - 59, Bar Point, mouth of Detroit River 136
  - 60, Eleven-Foot Shoal, Green Bay, Michigan 124
  - 61, Lake Huron, Lake Huron, Michigan 151
  - 62, Poe Reef, Straits of Mackinac, Michigan 151
  - 63, Ballard Reef, Detroit River, Michigan 137
  - 64, Limekiln Crossing (south), Detroit River 136
  - 65, Limekiln Crossing (north), Detroit River 136
  - 66, (*see* No. 54, Boston Harbor, Massachusetts) 46
- Light stations and depots, revised estimates for 30
  - total number 7
- *Lilac*, tender, First district 35, 43
- *Lily*, tender, Fifteenth district 175
- Limekiln Crossing light-ships, Nos. 64 and 65, Detroit River 136
- Lime Point fog signal, California 160
- Lime Rock, Narragansett Bay, Rhode Island 60
- Little Cumberland Island, Georgia 100
- Little Diamond Island depot, Maine 43
- Little Gull Island, New York 56
- Little River Head, Maine 33, 36
- Little Traverse, Michigan 118
- Livermore, W. R., major, Corps of Engineers, report of 49
- Location of lights, changes in 14
- Long Beach beacon, Connecticut 33
- Long Point, North Carolina 93
- Long Reach post lights, lower and upper, Thames River, Connecticut 56
- Losses of seamen in the light-house service, reimbursement of 33
  - Fourth district, reimbursement for 79
  - light keepers in the Sixth district, reimbursement for 33, 101
    - Eighth district, reimbursement for 34, 114
- *Lotus*, steam launch, Eleventh district 117, 140
- Lovells Island depot, Massachusetts 52
- Lower Cedar Point, Maryland 86
- Lower Hay Lake Cut, Hay Lake Channel, St. Marys River, Michigan 151
- Lower Kennebec River, Maine 38
- Lower Lake George, Michigan 144
- Lower Reach lights, St. Clair River, Michigan 141
- Ludington Pierhead, Michigan 34, 119
- Ludlam Beach, New Jersey 77
- Lynn Harbor, Massachusetts 45

M.

Page.

Machine and lamp shop, Boston, Mass 52
Mackenzie, Alexander, lieutenant-colonel, Corps of Engineers 5
Madroño, launch 156, 165
Madroño, tender, Twelfth district 156, 164
Mahon River, Delaware 76
Mamajuda Island range, Michigan 134
Manatee River and Tampa Bay beacons, Florida 107
Manhattan range, Ohio 134
Manana Island, Maine 40
Manistee, Mich 123
Manitowoc, Mich 120
    Pierhead, Michigan 121
Manzanita, tender, Thirteenth district 166, 172
Maple, tender, Fifth district 84, 94
Marblehead, Mass 45
Mare Island, California 159
Marigold, tender, Eleventh district 140, 154
Marquette, Lake Superior, Michigan 146
Marrowstone Point, Washington 169
Marshall Point, Maine 37
Martins Industry light-ship, No. 1, South Carolina 102
Martins Reef, Michigan, light-vessel for 151
Maryland Point, Maryland 86
Matinicus Rock, Maine 33, 37
Maumee Bay buoy depot, Ohio 138
    ranges, Ohio 133
Maumee, inner, Ohio 134
    middle, Ohio 134
    outer, Ohio 134
Maurice River range, New Jersey 76
Mayo Beach, Massachusetts 45
McGulpin Point, Michigan 117
McWilliams Point Shoal, North Carolina 90
Members of Light-House Board, June 30, 1896 3
    changes during fiscal year 5
Menasha, Wis 34, 123
Mendenhall, Prof. Thos. C 3
Mendota, Mich 147
Menominee Pierhead, Wisconsin 122
Middle Island, Michigan 34, 142
Middle Lake George, Michigan 144
Millis, John, captain, Corps of Engineers, United States Army 3, 178
Milwaukee Pierhead, Wisconsin 120
Mispillion Creek, Delaware 76
Mississippi River post lights 112
Mistletoe, tender, Third district 54, 73
Mobile Ship Channel beacons, Alabama 7, 113
Monhegan Dike post light, Thames River, Connecticut 56
Monhegan Island, Maine 40
Moose Peak, Mistake Island, Maine 36
Morris Island and Charleston ranges, South Carolina 102
Mosquito Inlet, Florida 101
Mother Bunch Island beacon, South Carolina 98

Page.
Mount Desert, Me 40
Mudd Lake, Michigan 34, 143
Murderkill Creek beacon, front, Delaware 76
  rear, Delaware 76
Muskegon Lake beacon, Michigan 119
Muskegnn Pierhead, Michigan 123
Myrtle, tender, First and Second districts 35, 44, 53

N.

Nantucket New South Shoal light-ship, No. 58, Massachusetts 47
Naphtha launch, Fourth district 75
Nauset Beach, Massachusetts 46
Navesink, N. J 58
Ned Point, Massachusetts 46
Negro Island, Maine 37
Nettle, steam launch, Third district 54, 74
New buoys established 17
Newburyport Harbor, Plum Island, Massachusetts 44
Newcastle (Portsmouth Harbor), N. H 39
New Dungeness, Wash 34, 169
New fog signals established during the year 11
New Haven Harbor Breakwater, Connecticut 33, 56
New lights established during the year 8
New light-ships, appropriations recommended 31
New light stations and depots, estimates for, revised 30
New London depot, Connecticut 71
New Point Comfort, Virginia 85
New tenders, appropriations recommended 31, 33
  Second district 31, 33, 53
  Third district 33, 74
  Fourth district 83
  Seventh and Eighth districts 33, 111, 116
New works authorized, no appropriations made 26
New York Lower Bay electric buoys 66
Niagara River range, New York 130
Ninth district, officers in charge 4, 117
  statistics of 117
Northeast End light-ship, No. 44, New Jersey 77
North Head, Cape Disappointment, Washington 168
North Hook beacon, New Jersey 61
North Landing River, Virginia 88
North Manitou, Mich 119
North River, North Carolina 88
Northwest Point Royal Shoal, North Carolina 89
Northwest Seal Rock, California. (*See* St. George Reef.)
Norwalk Harbor, Connecticut 33, 57
Norwalk Island, Connecticut 57

O.

Oakland Harbor, San Francisco Bay, California 160
Oak Orchard, N. Y 130
Oak Point, New York 128
Officers of Light-House Board 3
Officers in charge of light-house districts, June 30, 1896 3

Page.

Oglethorpe range front beacon, Georgia, 99
    rear beacon, Georgia, 99
Oil houses for light stations, 32
Oil, Fifteenth district, 175
    lard, 70
    mineral, 70
Old Mackinac Point, Michigan, 123
Old Orchard Shoal, New York, 58
Old Point, New York, 34
Old Point Comfort, Virginia, 85
Orient Point, New York, 33, 56
Oswego, N. Y, 136
Otter Creek, North Carolina, 90
Outer Diamond Shoal, North Carolina, 88
Overfalls Shoal light-vessel, New Jersey, 83
Oyster Beds, Georgia, 99
Oyster Pond Point, New York, 38, 56

P.

Pansy, tender, Eighth district, 112, 115
Patos Islands, Washington, 170
Pearl River, Mississippi, 113
Pecks Ledge, Connecticut, 33
Pemaquid Point, St. Johns Bay, Maine, 37
Penobscot Bay, Maine, 37
Pensacola buoy depot, Florida, 110
Percy Reach post light, New York, 60
Perkins Island, Maine, 38
Personnel of Board, changes, 5
    district officers, changes, 5
Petit Manan, Maine, 36
Pharos, tender, Sixth district, 96, 104
Piedras Blancas, California, 160
Pigeon Point, California, 34, 158
Pilot Island range, Michigan, 143
Piney Point, Maryland, 90
Plum Beach, Rhode Island, 55
Plum Island, Gardiners Bay, New York, 56
Plum Island, Massachusetts, 44
Plum Island range, Wisconsin, 121
Poe Reef light-ship, No. 62, Michigan, 151
    new light-ship for, 34, 151
Point Adams, Oregon, 168
Point Arena, California, 159
Point Arguello, California, 34, 157
Point Betsey, Michigan, 123
Point Brown, Washington, 34, 170
Point Comfort beacon, New Jersey, 58
Point Conception, California, 157
Pointe aux Barques, Michigan, 150
Pointe aux Herbes, Louisiana, 113
Point Hueneme, California, 34, 157
Point Iroquois, Lake Superior, Michigan, 145
Point Judith, Rhode Island, 60

Page.
Point Lorna, California 156
Point Lookout, Maryland 86
    depot, Maryland 93
Point No Point, Washington 34, 169
Point of Woods range, Michigan 143
Point Pinos, California 34, 157
Point Reyes, California 159
Point Sur, California 34, 157
Point Wilson, Washington 170
Pollock Rip light-ship, No. 47, Massachusetts 46
Pond Island, Maine 38
Pooles Island, Maryland 90
Portage Lake Pierhead range, Michigan 34, 119
Portage Lake and River lights, Michigan 147
Portage Lake Ship Canal, Michigan 148
    Pierhead, Michigan 149
Portage range, Lake Superior, Michigan 151
Portage River, Lake Superior, Michigan 34, 147
    range, Lake Superior, Michigan 147
Portland Breakwater, Maine 39
Portland Head, Casco Bay, Maine 40
Port Austin Reef, Lake Huron, Michigan 150
Port Chester, Long Island Sound, Connecticut 57
Port Clinton, Lake Erie, Ohio 133
Port Eads depot, Louisiana 115
Porte des Morts range (Pilot Island), Michigan 143
Port Jefferson Harbor, New York 57
Port Penn range, front, Delaware 76, 77
    rear, Delaware 77
Port Penn Wharf, Delaware 76
Port Pontchartrain, Louisiana 114
Port Townsend, Wash. (Point Wilson light) 170
Port Washington Pierhead, Wisconsin 123
Portsmouth depot, Virginia 33, 93
Portsmouth Harbor (Newcastle), New Hampshire 39
Post lights, number on Western rivers 7
    on other rivers 7
    in Third district 54
        Fourth district 75
        Fifth district 84, 92
        Sixth district 96, 97, 101
    Cape Fear River, North Carolina 96, 97
    Indian River, Florida 96, 101
    St. Johns River, Florida 96, 101
    in Eighth district 112
    Superior Bay, Wisconsin 150
    in Eleventh district 140, 150
        Twelfth district 156
        Thirteenth district 166, 169, 170
        Fourteenth district 173, 174
        Fifteenth district 175
        Sixteenth district 177
Pottawatomie, Wisconsin 123
Presque Isle, Michigan 150

Page.
Presqu'ile, Pennsylvania 131
  Pierhead, Erie Harbor, Pennsylvania 131
Pride Pier post light, Thames River, Connecticut 56
Princess Bay, Staten Island, New York 61
Proctor Place beacon, Georgia 99
Prospect Harbor, Maine 40
Prudence Island, Rhode Island 60
Puget Sound post lights, Washington 170
Pumpkin Island, Maine 40

Q.

Quarry Point, California 34, 158

R.

Race Point, Cape Cod Bay, Massachusetts 45
Race Rock, New York 56
Racine Pierhead, Wisconsin 120
Racine Point (Wind Point), Wisconsin 123
Racine, Lake Michigan, Wisconsin 123
Ragged Point, Virginia 33, 86
Ram Island, Maine 40
Ram Island Reef light-ship, No. 23, New York 61
Rappahannock River, Virginia 33, 85
Rattlesnake Shoal light-ship, South Carolina (*see* Charleston light-ship, No. 34) 102
Red Fish Bar, Texas 34, 114
Reeds Point, North Carolina 88
Reedy Island range, rear, Delaware 76
Reimbursement of losses of seamen in the Light-House Service 83
  Fourth district 79
  light keepers in the Sixth district 33, 101
  Eighth district 34, 114
Relief light-ships. (*See* Light-ships.)
Relief light-ship for the Fourth and Fifth districts 33, 78
Repairs and incidental expenses, appropriation asked 28, 32
Repairs of light-houses in First district 40
  Second district 46
  Third district 60
  Fourth district 77
  Fifth district 90
  Sixth district 102
  Seventh district 109
  Eighth district 114
  Ninth district 123
  Tenth district 136
  Eleventh district 150
  Twelfth district 160
  Thirteenth district 170
Report on experiments with fog signals 49
Rivers, appropriation for lighting, asked 30, 32
  number of laborers in charge of lights on 7
  post lights on 7
Roanoke Marshes, North Carolina 89
Roanoke River, North Carolina 90

Page.
Robbins Reef, New York 59
Robinson Point, Washington 170
Rock Island buoy depot, New York 138
Rockland Breakwater, Maine 37
Rockland Lake, New York 59
Rock of Ages, Michigan 34, 150
Roe Island, California 159
Rondout, Hudson River, New York 60
Rose Island, Rhode Island 60
Rose, tender, Third district 54, 74
Round Island, Straits of Mackinac, Michigan 142
Rouse Point Pierhead, New York 60

S.

Sabine Point, Rhode Island 60
Sacketts Harbor, N. Y 136
Saddleback Ledge, Maine 40
Saginaw River range, Lake Huron, Michigan 142
Sekonnet, R. I 60
Sailing tenders, number 7
St. Catherines Sound, Georgia 99
St. Clair Flats Canal, Michigan 141
St. Clair River lights, Michigan 141
St. Croix River, Maine 33, 35
St. George Reef, California 160
St. Helena, Straits of Mackinac, Michigan 117
St. Johns River post lights, Florida 101
range beacons, Florida 100
St. Jones Creek front beacon, Delaware 76
rear beacon, Delaware 76
St. Joseph buoy and supply depot, Michigan 126
Pierhead fog signal, Michigan 119
range, Michigan 123
St. Joseph Point, Florida 33, 108
St. Louis and Superior bays post lights, Minnesota and Wisconsin 150
St. Marks, Fla 107
St. Martins Reef light-ship, Lake Huron 34
St. Marys Falls Canal, Michigan 145
St. Marys River ranges, Michigan 145
St. Philip's Church, Charleston, S. C 98
Salaries of keepers, appropriation asked 28, 32
Salem Creek, New Jersey 76
Salisbury Beach, Massachusetts 46
Sampit River, South Carolina 97
Sand Beach (harbor of refuge), Lake Huron, Michigan 143
Sand Island, Alabama 34, 112
Sand Key, Florida 109
Sand Pier, Thames River, Connecticut 56
Sands Point, Connecticut 61
Sandusky (Ohio) buoy depot 138
Sandusky Bay, Ohio 133
ranges, Lake Erie, Ohio 133
Straight Channel range, Lake Erie, Ohio 133
Sandy Hook light-ship, No. 51, New Jersey 62

Page.

- Sandy Hook, New Jersey 58, 66, 67
  - North Hook, New Jersey 67
  - South Hook, New Jersey 58, 67
- San Francisco Harbor light-ship, California 34, 160
  - wreck of *Blairmore* light-vessel, California 161
- Sanibel Island, Florida 109
- Sankaty Head, Massachusetts 33, 45
- Santa Barbara, Cal 160
- Santa Cruz, Cal 158
- Sassafras Point, Rhode Island 60
- Saugerties, Hudson River, New York 61
- Sault range, St. Marys River, Michigan 144
- Savannah, Ga., to Fernandina, Fla., inside passage 100
- Savannah River Cut ranges, Georgia 99
- Saybrook Breakwater, Connecticut 61
- Saybrook (Lynde Point), Conn 61
- Schooner Ledge range, front, Pennsylvania 77
  - rear, Pennsylvania 77
- Schuylkill River range, Pennsylvania 77
- Scituate Breakwater, Massachusetts 45
- Scotland light-ship, No. 7, New York 62
- Sea wall at Staten Island depot, New York 33
- Seavys Island range, Portsmouth Harbor, Maine 40
- Second district, officers in charge of 8, 44
  - statistics of 44
- Seguin, Me 38
- Seul Choix Pointe, Michigan 122
- Seven-Foot Knoll, Patapsco River, Maryland 90
- Seventeen-Foot Knoll gas buoy, Delaware River, New Jersey 80
- Seventh district, officers in charge of 4, 106
  - statistics of 106
- Sharkfin Shoal, Chesapeake Bay, Maryland 90
- Sharpie, Fifth district 84
- Sharps Island, Chesapeake Bay, Maryland 90
- Sheboygan Pierhead, Wisconsin 120
  - range, Wisconsin 120
- Sherwood Point, Green Bay, Wisconsin 123
- Ship Channel, Mobile Bay, Alabama 7, 113
- Ship Shoal, Louisiana 113
- Shovelful Shoal light-ship, No. 3, Massachusetts 47
- Simmons Reef light-ship, No. 55, Michigan 123
- Sister Islands, St. Lawrence River, New York 128
- Sitka Harbor, Alaska 170
- Six-Mile Point range, Hay Lake Channel, Michigan 145
- Sixteenth district, officers in charge of 4, 177
  - statistics of 177
- Sixth district, officers in charge of 4, 96
  - statistics of 96
- Skilligallee, Mich 123
- Smith Island, Strait of Juan de Fuca, Washington 169
- Smith Point, Chesapeake Bay, Virginia 86
- Smith Point light-ship, No. 46, Virginia 91
- Solomons Lump, Kedge Straits, Maryland 86
- Sombrero Key, Florida 109

Page.

Somers Cove, Maryland 90

South Bass Island, Lake Erie, Ohio 133

South Boston range, Boston Harbor, Massachusetts 45

South Chicago Pierhead (Calumet), Illinois 120

Southeast Bend lights, St. Clair River, Michigan 141

South Fox Island, Michigan 118

South Haven Pierhead, Michigan 123

South Hero, Vt 60

South Manitou, Mich 119

South Milwaukee, Wis 34, 120

South Pass, East Jetty, Louisiana 113

South Pass light-ship, No. 43, Mississippi River 115

South Pass, West Jetty, Louisiana 113

Southwest Ledge, Long Island Sound, Connecticut 56

Southwest Pass, Louisiana 114

Southwest Point, Royal Shoal, North Carolina 90

Southwest Spit, New Jersey 33, 58

Sow and Pigs (Vineyard Sound) light-ship, No. 41 48

Special works, appropriations for, 1896–97 26

  estimates 33

Spectacle Island range, Boston Harbor, Massachusetts 45

Spectacle Reef, Lake Huron, Michigan 150

Spring Point Ledge, Maine 38

Squan Inlet, New Jersey 75

Squaw Point, Michigan 122

Squirrel Point, Maine 38

Stage Harbor, Massachusetts 46

Stamford Harbor, Connecticut 61

Staniford Ledge fog-bell buoy, Maine 39

Stannard Rock, Lake Superior, Michigan 151

State Ledge, Massachusetts 33, 45

Staten Island depot, New York, description, operation, etc 68

  necessity for improvement 69

  estimate for sea wall, etc 33, 70

Statistics of aids to navigation for year ending June 30, 1896 .... 7, 25

Steam launches, number 7

Steam tenders, number 7

Stepping Stones, New York 58

Stonington Breakwater, Connecticut 55

Stony Point, Hudson River, New York 61

Stony Point, Lake Ontario, New York 129

Straitsmouth, Massachusetts 44

Straits of Mackinac, Michigan, proposed depot 127

Stratford Point, Connecticut 56

Stratford Shoal (Middle Ground), New York 56

Sturgeon Bay Canal, Wisconsin 123

Sturgeon Point, Lake Huron, Michigan 150

Stuyvesant, Hudson River, New York 61

Succonnesset Shoal light-ship, No. 6, Massachusetts 48

Sullivans Island Cove Pierhead, South Carolina 102

Sunken Rock, St. Lawrence River, New York 136

Superior Bay post lights, Minnesota and Wisconsin 150

Superior Pierhead, Lake Superior, Wisconsin 151

Supplies of light-houses, appropriation asked 27, 32

	Page.
Survey of light-house sites, appropriation asked	32
Swash Channel range, Charleston Harbor, South Carolina	98
Sweets Point, St. Marys River, Michigan	143

T.

Tail Point, Green Bay, Wisconsin	34, 122
Tampa Bay and Manatee River beacons, Florida	107
Tarrytown, Hudson River, New York	59
Tawas, Lake Huron, Michigan	142
Telephonic communication between light-ships and shore	62
Temporary changes in aids to navigation	19
Tenders in First district, *Myrtle*, *Lilac*	35, 43
Second district, *Azalea*, *Verbena*, *Myrtle*, *Geranium*	44, 52
Third district, *Armeria*, *Cactus*, *Mistletoe*, *John Rodgers*, *Gardenia*, *Nettle*, *Daisy*, *Rose*	54, 71
Fourth district, *Zizania*	75, 82
Fifth district, *Maple*, *Jessamine*, *Violet*, *Bramble*, *Thistle*, and a sharpie	84, 94
Sixth district, *Wistaria*, *Pharos*	96, 104
Seventh district, *Laurel*, *Arbutus*, *Clover*	106, 110
Eighth district, *Pansy*, *Arbutus*	112, 115
Ninth district, *Dahlia*, *Amaranth*, *Warrington*, *Lotus*	117, 127
Tenth district *Haze*	128, 138
Eleventh district, *Amaranth*, *Warrington*, *Lotus*, *Marigold*	140, 154
Twelfth district, *Madroño*, *Hazel*	156, 164
Thirteenth district, *Manzanita*, *Columbine*	166, 172
Fourteenth district, *Goldenrod*	173, 174
Fifteenth district, *Lily*	175
Sixteenth district, *Joseph Henry*	177, 178
number in service	7
new, appropriations asked	33
for Second district	31, 33, 53
Third district	33, 74
Fourth district	33
Seventh and Eighth districts	33, 111, 116
Tenpound Island, Massachusetts	46
Tenth district, officers in charge of	4, 128
statistics of	128
Thames River post lights, Connecticut	56
Thatcher Island, Massachusetts (*see* Cape Ann)	44
Thimble Shoal, Chesapeake Bay, Virginia	90
Third district, officers in charge of	3, 54
statistics of	54
Thirteenth district, officers in charge of	4, 166
statistics of	166
Thirty-Mile Point, Lake Ontario, New York	130
Thistle, tender, Fifth district	83, 84, 95
Thomas Point Shoal, Maryland	87
Throgs Neck, Long Island Sound, New York	58
Thunder Bay Island, Lake Huron, Michigan	150
Tibbetts Point, New York	129
Tiger Island north range, Fernandina Harbor, Florida	100
south range, Fernandina Harbor, Florida	100
Tillamook Rock, Oregon	167

Page.
Tinicum Island range, rear, Delaware River, New Jersey ... 77
Tompkinsville general light-house depot, New York ... 68
Tongue Point depot, Oregon ... 84, 172
Tortugas buoy depot, Florida ... 109
  Harbor, Florida ... 106
Trinidad Head, California ... 160
Tucker Beach, New Jersey ... 77
Turn Point, Washington ... 170
Turtle Island, Lake Erie, Ohio ... 136
Twelfth district, officers in charge of ... 4, 156
  statistics of ... 156
Twin River Point, Wisconsin ... 121
Two Bush Island, Maine ... 37
Two Harbors, Minn ... 150
  Breakwater, Minnesota ... 150
Two Rivers Pierhead, Wisconsin ... 121

U.

Umatilla Reef light-ship, No. 67, Washington ... 170
Umpqua River, Oregon ... 167
Unlighted aids, total number ... 7, 25
Upper Cedar Point, Maryland ... 90

V.

Venus Point, Savannah River, South Carolina ... 99
Verbena, tender, Second district ... 44, 58
Vermilion, Lake Erie, Ohio ... 136
Vineyard Sound light-ship, No. 41, Massachusetts ... 48
Violet, tender, Fifth district ... 84, 94
Volusia Bar, St. Johns River, Florida ... 102

W.

Waackaack, New Jersey ... 61
Wadmelaw River beacons, South Carolina ... 98
Walker, John G., rear-admiral, United States Navy ... 3, 178
Warrington, tender, Ninth and Eleventh districts ... 117, 127, 140
Warrior Rock, Columbia River, Oregon ... 170
Warwick, Narragansett Bay, Rhode Island ... 55
Washington depot, North Carolina ... 93
Watch Hill, R. I ... 60
Water Lily, steam launch, Sixth district ... 105
Waugoshance, Lake Michigan, Michigan ... 117
West Bank, New York ... 33, 58
West Chop, Vineyard Sound, Massachusetts ... 46
Western rivers, number of post lights ... 7
West Flat (Catskill), Hudson River, New York ... 60
West Point, Puget Sound, Washington ... 170
West Quoddy Head, Maine ... 36
West Rigolets, Lake Pontchartrain, Louisiana ... 114
West Sister Island, Lake Erie, Ohio ... 133
Whaleback, New Hampshire ... 39
Whale Rock, Narragansett Bay, Rhode Island ... 60
Whipple Point, Vermont ... 60

Page

Whistling buoys in position 7, 25
    established and discontinued during fiscal year 18, 19
    in First district 35, 42
        Second district 44, 52
        Third district 54, 65
        Fourth district 75, 80
        Fifth district 84, 92
        Sixth district 96, 103
        Seventh district 106, 109
        Eighth district 112, 115
        Twelfth district 156, 163
        Thirteenth district 166, 171
Whitefish Point, Lake Superior, Michigan 145
Whitehead (Me.) depot 43
White River, Lake Michigan, Michigan 123
White Shoal light-ship, No. 56, Lake Michigan 123
Whitestone Point, East River, New York 61
Whitlocks Mill, St. Croix River, Maine 33, 35
Wickford Harbor, Narragansett Bay, Rhode Island 60
Wilde, George F. F., commander, United States Navy 3, 178
Wilkinson Point, North Carolina 90
Willamette River, Oregon 168
    post lights, Oregon 170
Windmill Point, Chesapeake Bay, Virginia 90
    Lake Champlain, Vermont 61
    Lake St. Clair, Michigan 140
Wind Point (Racine Point), Lake Michigan, Wisconsin 123
Wings Neck, Buzzards Bay, Massachusetts 46
Winter Harbor, Maine 40
Winter Point range, St. Marys River, Michigan 143
Winter-Quarter Shoal light-ship, No. 45, Virginia 78
Winyah Bay beacons, South Carolina 97
Wistaria, tender, Sixth district 96, 104
Wolf Island range, Georgia 102
Wolf Trap, Chesapeake Bay, Virginia 85
Wood End, Cape Cod Bay, Massachusetts 46
Wood Island, Maine 40
Woods Hole depot, Massachusetts 52
Works, new, authorized, no appropriation made 26
Wreck of *Blairmore* light vessel, San Francisco Bay, California 161

Y.

Yaquina Bay, Oregon 170
Yaquina Head, Oregon 167
Yerba Buena, San Francisco Bay, California 34, 159
    depot, California 164
York Spit, Virginia 85

Z.

Zizania, tender, Fourth district 75, 82

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ANNUAL REPORT

OF THE

LIGHT-HOUSE BOARD

TO THE

SECRETARY OF THE TREASURY

FOR THE

FISCAL YEAR ENDED JUNE 30, 1897.

WASHINGTON:
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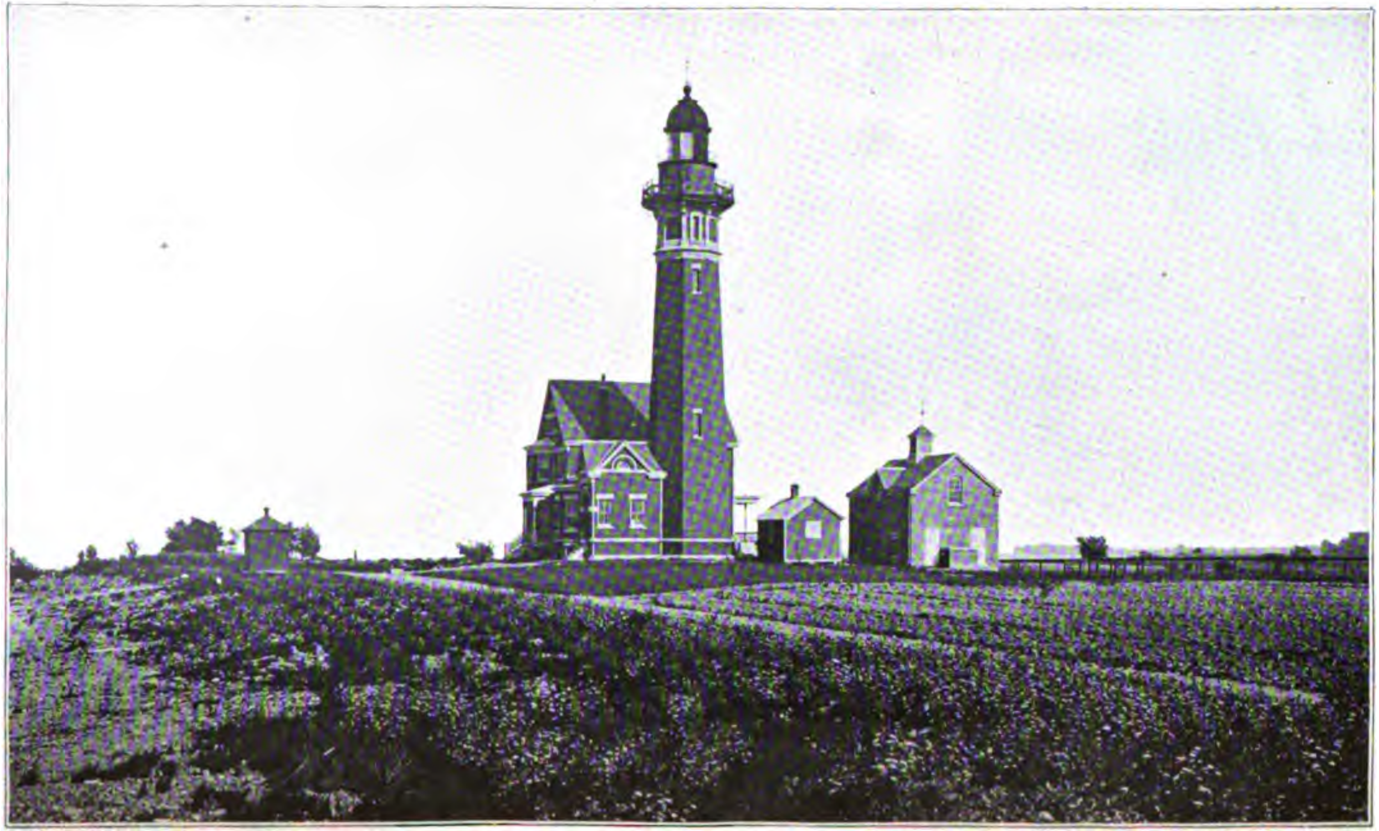

BRADDOCK POINT LIGHT STATION, LAKE ONTARIO, NEW YORK.

ANNUAL REPORT

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TO THE

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FOR THE

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LIGHT-HOUSE BOARD OF THE UNITED STATES.

Organized in conformity to the act of Congress approved August 31, 1852.

LIST OF MEMBERS ON JUNE 30, 1897.

Hon. LYMAN J. GAGE, Secretary of the Treasury, ex officio President.
Capt. WINFIELD S. SCHLEY, United States Navy, Chairman.
Col. WALTER S FRANKLIN.
Col. GEORGE L. GILLESPIE, Corps of Engineers, United States Army.
Lieut. Col. ALEXANDER MACKENZIE, Corps of Engineers, United States Army.
Capt. ROBLEY D. EVANS, United States Navy.
Gen. WILLIAM W. DUFFIELD, Superintendent of the United States Coast and Geodetic Survey.
Commander GEORGE F. F. WILDE, United States Navy, Naval Secretary.
Capt. JOHN MILLIS, Corps of Engineers, United States Army, Engineer Secretary.

EXECUTIVE MEMBERS OF THE BOARD.

Capt. WINFIELD S. SCHLEY, United States Navy.
Commander GEORGE F. F. WILDE, United States Navy.
Capt. JOHN MILLIS, Corps of Engineers, United States Army.

OFFICERS IN CHARGE OF LIGHT-HOUSE DISTRICTS ON JUNE 30, 1897.

FIRST DISTRICT.

Inspector.—Commander N. MAYO DYER, United States Navy, Portland, Me.

Engineer.—Maj. WILLIAM R. LIVERMORE, Corps of Engineers, United States Army, Boston, Mass.

SECOND DISTRICT.

Inspector.—Lieut. Commander HARRISON G. O. COLBY, United States Navy, Boston, Mass.

Engineer.—Maj. WILLIAM R. LIVERMORE, Corps of Engineers, United States Army, Boston, Mass.

THIRD DISTRICT.

Inspector.—Commander ALBERT S. SNOW, United States Navy, Tompkinsville, N. Y.

Engineer.—Lieut. Col. DAVID P. HEAP, Corps of Engineers, United States Army, Tompkinsville, N. Y.

FOURTH DISTRICT.

Inspector.—Commander CHARLES J. TRAIN, United States Navy, Philadelphia, Pa.

Engineer.—Maj. WILLIAM H. BIXBY, Corps of Engineers, United States Army, Philadelphia, Pa.

FIFTH DISTRICT.

Inspector.—Commander B. P. LAMBERTON, United States Navy, Baltimore, Md.

Engineer.—Maj. ERNEST H. RUFFNER, Corps of Engineers, United States Army, Baltimore, Md.

SIXTH DISTRICT.

Inspector.—Commander SETH M. ACKLEY, United States Navy, Charleston, S. C.

Engineer.—Capt. FREDERIC V. ABBOT, Corps of Engineers, United States Army, Charleston, S. C.

SEVENTH DISTRICT.

Inspector.—Commander SAMUEL BELDEN, United States Navy, Key West, Fla.

Engineer.—Lieut. Col. A. N. DAMRELL, Corps of Engineers, United States Army, Mobile, Ala.

EIGHTH DISTRICT.

Inspector.—Lieut. Commander ALBION V. WADHAMS, United States Navy, New Orleans, La.

Engineer.—Lieut. Col. A. N. DAMRELL, Corps of Engineers, United States Army, Mobile, Ala.

NINTH DISTRICT.

Inspector.—Commander EUGENE H. C. LEUTZE, United States Navy, Chicago, Ill.

Engineer.—Maj. MILTON B. ADAMS, Corps of Engineers, United States Army, Detroit, Mich.

TENTH DISTRICT.

Inspector.—Commander THEODORE F. JEWELL, United States Navy, Buffalo, N. Y.

Engineer.—Col. JARED A. SMITH, Corps of Engineers, United States Army, Cleveland, Ohio.

ELEVENTH DISTRICT.

Inspector.—Commander WILLIAM M. FOLGER, United States Navy, Detroit, Mich.

Engineer.—Maj. MILTON B. ADAMS, Corps of Engineers, United States Army, Detroit, Mich.

TWELFTH DISTRICT.

Inspector.—Commander FRANK COURTIS, United States Navy, San Francisco, Cal.

Engineer.—Maj. CHARLES E. L. B. DAVIS, Corps of Engineers, United States Army, San Francisco, Cal.

THIRTEENTH DISTRICT.

Inspector.—Commander JOHN P. MERRELL, United States Navy, Portland, Oreg.

Engineer.—Capt. WALTER L. FISK, Corps of Engineers, United States Army, Portland, Oreg.

FOURTEENTH DISTRICT.

Inspector.—Commander BENJAMIN S. RICHARDS, United States Navy, Cincinnati, Ohio.

Engineer.—Maj. WILLIAM H. HEUER, Corps of Engineers, United States Army, Cincinnati, Ohio.

FIFTEENTH DISTRICT.

Inspector.—Lieut. Commander HENRY B. MANSFIELD, United States Navy, St. Louis, Mo.

Engineer.—Lieut. Col. AMOS STICKNEY, Corps of Engineers, United States Army, St. Louis, Mo.

SIXTEENTH DISTRICT.

Inspector.—Commander WILLIAM T. BURWELL, United States Navy, Memphis, Tenn.

Engineer.—Lieut. Col. AMOS STICKNEY, Corps of Engineers, United States Army, St. Louis, Mo.

PERSONNEL.

The following changes have taken place in the personnel of the Light-House Board since the date of the last annual report:

1. On March 4, 1897, Hon. JOHN G. CARLISLE, Secretary of the Treasury, ex officio president, was succeeded by Hon. LYMAN J. GAGE.

2. On January 5, 1897, Capt. JOHN R. BARTLETT, United States Navy, was succeeded by Capt. ROBLEY D. EVANS, United States Navy.

3. On March 23, 1897, Rear-Admiral JOHN G. WALKER, United States Navy, chairman, was succeeded by Capt. WINFIELD S. SCHLEY, United States Navy.

4. On April 27, 1897, Col. JOHN M. WILSON, Corps of Engineers, United States Army, was succeeded by Col. GEORGE L. GILLESPIE, Corps of Engineers, United States Army.

The following-named changes in the personnel of the district officers took place during the fiscal year:

SECOND DISTRICT.

Inspector.—Commander FRANCIS M. GREEN, United States Navy, to January 2, 1897; Lieut. Commander HARRISON G. O. COLBY, United States Navy, from January 2, 1897.

THIRD DISTRICT.

Engineer.—Lieut. Col. WILLIAM LUDLOW, Corps of Engineers, United States Army, to March 19, 1897; Lieut. Col. DAVID P. HEAP, Corps of Engineers, United States Army, from March 19, 1897.

SEVENTH DISTRICT.

Inspector.—Commander WILLIAM B. NEWMAN, United States Navy, to November 7, 1896; Commander SAMUEL BELDEN, United States Navy, from November 7, 1896.

Engineer.—Maj. JAMES B. QUINN, Corps of Engineers, United States Army, to May 25, 1897; Lieut. Col. A. N. DAMRELL, Corps of Engineers, United States Army, from May 25, 1897.

EIGHTH DISTRICT.

Inspector.—Commander JOSEPH B. COGHLAN, United States Navy, to February 1, 1897; Lieut. Commander ALBION V. WADHAMS, United States Navy, from February 1, 1897.

Engineer.—Maj. JAMES B. QUINN, Corps of Engineers, United States Army, to May 25, 1897; Lieut. Col. A. N. DAMRELL, Corps of Engineers, United States Army, from May 25, 1897.

NINTH DISTRICT.

Inspector.—Commander JAMES H. DAYTON, United States Navy, to May 1, 1897; Commander EUGENE H. C. LEUTZE, United States Navy, from May 1, 1897.

TENTH DISTRICT.

Inspector.—Commander CHARLES V. GRIDLEY, United States Navy, to April 30, 1897; Commander THEODORE F. JEWELL, United States Navy, from April 30, 1897.

FOURTEENTH DISTRICT.

Inspector.—Lieut. Commander WILLIAM W. GILPATRICK, United States Navy, to October 16, 1896, on which date he died; Commander BENJAMIN S. RICHARDS, United States Navy, from October 24, 1897.

FIFTEENTH DISTRICT.

Inspector.—Lieut. Commander ABRAHAM B. H. LILLIE, United States Navy, to April 30, 1897; Lieut. Commander HENRY B. MANSFIELD, United States Navy, from April 30, 1897.

REPORT

OF

THE UNITED STATES LIGHT-HOUSE BOARD.

TREASURY DEPARTMENT,
OFFICE OF THE LIGHT-HOUSE BOARD,
Washington, D. C., November 15, 1897.

SIR: The Light-House Board has the honor to submit the following report for the fiscal year which ended on June 30, 1897:

At the close of the year there were under the control of the Light-House Establishment the following-named aids to navigation:

Light-houses and beacon lights, including twenty-one temporary lights, Mobile Harbor	1,116
Light-vessels in position	42
Light-vessels for relief	5
Electric-lighted buoys in position	11
Gas-lighted buoys in position	30
Fog signals operated by steam, caloric, or oil engines	149
Fog signals operated by clockwork	205
Post lights	1,779
Day or unlighted beacons	424
Whistling buoys in position	71
Bell buoys in position	112
Other buoys in position, including pile buoys and stakes in Fifth district and buoys in Alaskan waters	4,710

In the construction, care, and maintenance of these aids to navigation there were employed—

Steam tenders	28
Steam launches	11
Sailing tenders	2
Light keepers	1,292
Other employees, including crews of light-ships and tenders	1,144
Laborers in charge of post lights	1,859

NEW LIGHTS.

The following-named lights were established during the fiscal year:

Portage River Range, Lake Superior, Michigan.—Two white lantern lights, July 3, 1896.

Fire Island light-vessel, New York.—Two reflector lights, July 15, 1896.

Port Clinton, Lake Erie, Ohio.—A lens-lantern light, July 15, 1896.

East Bank gas buoy, No. 2, East Channel, New York Lower Bay, New York.—A gas-lighted buoy, August 5, 1896.

East Bank gas buoy, No. 4, East Channel, New York Lower Bay, New York.—A gas-lighted buoy, August 5, 1896.

Port Jefferson East Breakwater Beacon Light, Long Island Sound, New York.—A lantern light, August 10, 1896.

Port Jefferson West Beacon Light, Long Island Sound, New York.—A lantern light, August 10, 1896.

Braddock Point, Lake Ontario, New York.—A three and one-half order light, August 17, 1896.

Bay State Shoal gas buoy, No. 5, St. Lawrence River, New York.—A gas-lighted buoy, August 24, 1896.

Empire Shoal gas buoy, No. 6, St. Lawrence River, New York.—A gas-lighted buoy, August 24, 1896.

Chapman Shoal gas buoy, No. 14, St. Lawrence River, New York.—A gas-lighted buoy, August 25, 1896.

Pilot Town Range beacon lights, St. Johns River, Florida.—Two lens-lantern lights, September 1, 1896.

Mayport Range beacon lights, St. Johns River, Florida.—Two lens-lantern lights, September 1, 1896.

Fort George Creek Range beacon lights, St. Johns River, Florida.—Two lantern lights, September 1, 1896.

Lower Cedar Point beacon light, Potomac River, Maryland.—A lantern light, September 5, 1896.

Lower Cedar Point light-station, Potomac River, Maryland.—A fourth-order light, September 5, 1896. (Reestablished on old foundation.)

Handkerchief light-vessel, No. 4, Nantucket Sound, Massachusetts.—A lens-lantern light in addition to the reflector light, September 15, 1896.

Mount Coffin Stone Crusher post light, Columbia River, Washington.—A lantern light, October 21, 1896.

Big Bay Point light-station, Lake Superior, Michigan.—A third-order light, October 22, 1896.

Cedar Point light-station, Chesapeake Bay, Maryland.—A fourth-order light, October 31, 1896.

Turning Point beacon light, harbor of Cedar Keys, Florida.—A lantern light, October 31, 1896.

Six-Foot Spot beacon light, St. George Sound, Florida.—A lantern light, October 31, 1896.

Porter Bar beacon light, St. George Sound, Florida.—A lantern light, October 31, 1896.

Bulkhead Cut Range beacon lights, Apalachicola Bay, Florida.—Two lantern lights, October 31, 1896.

Chandeleur light-station, Louisiana.—A third-order light, October 31, 1896.

Salem Creek light-station, Delaware River, New Jersey.—A lens-lantern light, November 17, 1896.

Fishing Point beacon light, seacoast of Virginia.—A lantern light, November 18, 1896.

Sabine Pass Jetty beacon light, entrance to Sabine Pass, Louisiana.—A lens-lantern light, November 30, 1896.

Squan Inlet light-station, seacoast of New Jersey.—A fourth-order light, December 10, 1896.

Martin Island Lower post light, Columbia River, Washington.—A lantern light, December 23, 1896.

Chapel Hill Range Cut gas buoy, New York Lower Bay, New York.—A gas-lighted buoy, December 26, 1896.

Frankfort Pierhead Range rear light-station, Lake Michigan, Michigan.—A lens-lantern light, January 22, 1897.

Reeds Point beacon-light station, Albemarle Sound, North Carolina.—A lantern light, February 1, 1897.

White Rocks light, Lynn Harbor, Massachusetts.—Two lantern lights, February 10, 1897.

Black Rocks light, Lynn Harbor, Massachusetts.—A lantern light, February 10, 1897.

Sandy Point light, Lynn Harbor, Massachusetts.—A lantern light, February 10, 1897.

Black Marsh Channel light, Lynn Harbor, Massachusetts.—A lantern light, February 10, 1897.

Pablo Creek post light, St. Johns River, Florida.—A lantern light, February 20, 1897.

Reddie Point post light, No. 19, St. Johns River, Florida.—A lantern light, February 20, 1897.

Trout Creek post light, No. 24, St. Johns River, Florida.—A lantern light, February 20, 1897.

Grassy Island North Channel Range light-station, Detroit River, Michigan.—Two-lens lantern lights, April 1, 1897.

Ragged Point Spit gas buoy, No. 9, Potomac River, Maryland.—A gas-lighted buoy, April 7, 1897.

Ballard Reef Channel South gas buoy, No. 1, Detroit River, Michigan.—A gas-lighted buoy, April 8, 1897.

Ballard Reef Channel Middle gas buoy, No. 3, Detroit River, Michigan.—A gas-lighted buoy, April 8, 1897.

Ballard Reef Channel North gas buoy, No. 5, Detroit River, Michigan.—A gas-lighted buoy, April 8, 1897.

Inner End of Straight Cut gas buoy, No. 30, Maumee Bay, Ohio.—A gas-lighted buoy, April 12, 1897.

Johnson Point beacon light, Neuse River, North Carolina.—A lantern light, April 15, 1897.

Lower Green Spring beacon light, Neuse River, North Carolina.—A lantern light, April 15, 1897.

Upper Green Spring beacon light, Neuse River, North Carolina.—A lantern light, April 15, 1897.

Erie Harbor Outer gas buoy, No. 2, Pennsylvania.—April 24, 1897.

Stockport post light, Hudson River, New York.—A lantern light, April 26, 1897.

Fitchs Wharf post light, Hudson River, New York.—A lantern light, April 26, 1897.

Forty-Mile Point light-station, Lake Huron, Michigan.—A fourth-order light, April 30, 1897.

Plum Island (front) light-station, Porte des Morts Passage, Wisconsin.—A sixth-order light, May 1, 1897.

Plum Island (rear) light-station, Porte des Morts Passage, Wisconsin.—A fourth-order light, May 1, 1897.

Poverty Island Shoal gas buoy, Lake Michigan, Michigan.—A gas-lighted buoy, May 5, 1897.

Gravelly Island Shoal gas buoy, entrance to Green Bay, Michigan.—A gas-lighted buoy, May 5, 1897.

Pollock Rip Slue gas buoy, entrance to Nantucket Sound, Massachusetts.—A gas-lighted buoy, May 7, 1897.

Fisherman Shoal gas buoy, Lake Michigan, Wisconsin.—A gas-lighted buoy, May 8, 1897.

Lansing Shoal gas buoy, Lake Michigan, Michigan.—A gas-lighted buoy, May 8, 1897.

Spectacle Island Range light-station, Boston Harbor, Massachusetts.—A reflector light in each of the two towers, May 20, 1897.

Spring Point Ledge light-station, entrance to Portland Harbor, Maine.—A fifth-order light, May 24, 1897.

Hen and Chickens (northeast) gas buoy, entrance to Larchmont Harbor, Long Island Sound, New York.—A gas-lighted buoy, May 25, 1897.

East Bank gas buoy, No. 6, New York Lower Bay, New York.—A gas-lighted buoy, June 14, 1897.

Coney Island Channel gas buoy, New York Lower Bay, New York.—A gas-lighted buoy, June 14, 1897.

Midnight Channel post light, No. 1, Cape Fear River, North Carolina.—A lantern light, June 15, 1897.

Logs and Big Island Channel post light, No. 9, Cape Fear River, North Carolina.—A lantern light, June 15, 1897.

Brunswick Channel post light, No. 6, Cape Fear River, North Carolina.—A lantern light, June 15, 1897.

Coos Bay Entrance Range light-station, Oregon.—Two lantern lights, June 15, 1897.

Coos Bay Inside Range light-station, Oregon.—Two lantern lights, June 15, 1897.

Pony Bend light-station, Coos Bay, Oregon.—A lantern light, June 15, 1897.

Windy Point post light, Grand Lake, Louisiana.—A lantern light, June 17, 1897.

Favret post light, Mississippi River, Louisiana.—A lantern light, June 18, 1897.

Old Quarantine post light, Mississippi River, Louisiana.—A lantern light, June 19, 1897.

Tropical Bend post light, Mississippi River, Louisiana.—A lantern light, June 19, 1897.

Rappelle Canal post light, Mississippi River, Louisiana.—A lantern light, June 19, 1897.

NEW FOG SIGNALS.

During the fiscal year fog signals were established at the following-named existing light stations:

Lower Cedar Point light-station, Potomac River, Maryland.—A fog bell, struck by machinery, September 5, 1896. (Reestablished.)

Cape Arago light-station, seacoast of Oregon.—A Daboll trumpet, September 20, 1896.

Round Island light-station, Straits of Mackinac, Michigan.—A 10-inch steam whistle, October 20, 1896.

Ram Island light-station, entrance to Boothbay, Maine.—A bell struck by machinery, February 9, 1897.

Southwest Ledge light-station, entrance to New Haven Harbor, Connecticut.—A Daboll trumpet, March 30, 1897.

Tibbetts Point light-station, head of St. Lawrence River, New York.—A 10-inch steam whistle, April 15, 1897.

Plumb Beach light-station, Narragansett Bay, Rhode Island.—A bell struck by machinery, June 1, 1897.

In addition to the foregoing the following new fog signals were established during the fiscal year:

Fire Island light-vessel, New York.—A 12-inch steam chime whistle, July 15, 1896.

Port Jefferson East Breakwater beacon light-station, New York.—A bell struck by machinery, August 10, 1896.

Old Orchard Shoal light-station, New York Lower Bay, New York.—A blower siren, August 20, 1896.

Race Rock light-station, New York.—A second-class siren, October 20, 1896.

Big Bay Point light-station, Lake Superior, Michigan.—A 10-inch steam whistle, October 22, 1896.

Cedar Point light-station, Chesapeake Bay, Maryland.—A bell struck by machinery, October 31, 1896.

North Manitou light-station, Lake Michigan, Michigan.—A 10-inch steam whistle, November 20, 1896.

Forty-Mile Point light-station, Lake Huron, Michigan.—A 10-inch steam whistle, April 30, 1897.

Plum Island Range Rear light-station, Porte des Morts Passage, Wisconsin.—A steam siren, May 1, 1897.

Spring Point Ledge light-station, entrance to Portland Harbor, Maine.—A bell struck by machinery, May 24, 1897.

LIGHTS DISCONTINUED.

In the course of the fiscal year the following-named lights were discontinued:

Mobile Ship Channel beacon light, No. 41, Alabama.—Carried away by a tow September 8, 1896.

Gedney Channel electric buoys (old system), New York Lower Bay, New York and New Jersey.—Six electric-lighted buoys, November 11, 1896.

Bull Bay Pierhead light-station, South Carolina.—A tubular lantern light, November 14, 1896.

St. Joseph Pierhead (front) light, Lake Michigan, Michigan.—A lantern light, November 15, 1896.

Mobile Ship Channel beacon light, No. 21, Mobile Bay, Alabama.—Carried away by a passing vessel November 25, 1896.

Mobile Ship Channel beacon light, No. 29, Alabama.—A lantern light, December 30, 1896.

Bull Bay light-station, South Carolina.—A fourth-order light, February 25, 1897 (to be reestablished).

Maumee Bay Ranges South light-station, Lake Erie, Ohio.—A lens-lantern light, March 16, 1897.

Baker Shoal gas buoy, No. 20, Delaware River, New Jersey.—A gas-lighted buoy, May 14, 1897.

Seventeen-Foot Knoll gas buoy, No. 34, Delaware River, New Jersey.—A gas-lighted buoy, May 14, 1897.

Mandarin Point post light, No. 29, St. Johns River, Florida.—A tubular lantern light, June 1, 1897.

Upper Drum Shoal post light, No. 7, Cape Fear River, North Carolina.—A tubular lantern light, June 15, 1897.

Second Eastern Jetty post light, No. 13, Cape Fear River, North Carolina.—A tubular lantern light, June 15, 1897.

Third Western Jetty post light, No. 14, Cape Fear River, North Carolina.—A tubular lantern light, June 15, 1897.

Tocoi post light, No. 41, St. Johns River, Florida.—A tubular lantern light, June 30, 1897.

CHANGES IN LIGHTS.

During the fiscal year the following changes were made in existing lights:

Nantucket New South Shoal light-vessel, Massachusetts.—Light-vessel No. 58 withdrawn from her station and permanently replaced by steam light-vessel No. 66, showing two electric lights, July 6, 1896.

Amelia Island Range lights, Fernandina Entrance, Florida.—Each changed from a tubular to a lens-lantern light, July 9, 1896.

Tiger Island North Range lights, Fernandina Entrance, Florida.—Each changed from a tubular to a lens-lantern light, July 9, 1896.

Poydras Hall post light, Louisiana.—Changed from a red to a white light, July 25, 1896.

Dunkirk Pierhead light, Lake Ontario, New York.—Changed from a tubular to a lens-lantern light, July 25, 1896.

Murderkill Creek Range (rear) beacon light, Delaware Bay, Delaware.—Height decreased to 40 feet, August 19, 1896.

St. Jones Creek Range (front) beacon light, Delaware Bay, Delaware.—Height increased to 13 feet, August 19, 1896.

St. Jones Creek Range (rear) beacon light, Delaware Bay, Delaware.—Height increased to 26 feet, August 19, 1896.

Brazos River light-station, Texas.—Light changed to show a white flash every 10 seconds, August 20, 1896.

Presqu'ile light-station, Pennsylvania.—Height of light increased to 73½ feet, September 8, 1896.

Stanwood post light, Skagit River, Washington.—Name changed to Skagit River Channel post light, September 17, 1896.

Portage Lake Ship Canal light-station, Michigan.—Height of light increased to 66 feet, September 26, 1896.

Lower Cedar Point light, Potomac River, Maryland.—Changed to show a fixed white light by discontinuance of red sector, October 10, 1896.

Upper Cedar Point light, Potomac River, Maryland.—Changed by discontinuance of southwesterly fixed red sector, October 10, 1896.

Nantucket New South Shoal light-vessel, Massachusetts.—Name changed to Nantucket Shoals light-vessel, October 17, 1896.

Mendota light-station, Lake Superior, Michigan.—Changed to show a fixed white light, October 31, 1896.

Bayou St. John light-station, Lake Pontchartrain, Louisiana.—Changed from white to red, November 10, 1896.

Frying-Pan Shoal light-vessel, North Carolina.—Light-vessel No. 53 withdrawn and permanently replaced by light-vessel No. 1, November 11, 1896.

Snead Point Shoal beacon light, Tampa Bay, Florida.—Changed to illuminate the entire horizon, November 19, 1896.

Sand Beach Harbor of Refuge light-station, Lake Huron, Michigan.—East Entrance South light and North Entrance West light each changed from a tubular to a lens-lantern light, November 20, 1896.

Cape Hatteras beacon light, seacoast of North Carolina.—Changed from a sixth-order to a lens-lantern light, November 25, 1896.

Martins Industry light-vessel, seacoast of South Carolina.—Steam Light-Vessel No. 53 permanently established, and Relief Light-Vessel No. 29 withdrawn, December 23, 1896.

South Hook beacon (Southwest Spit range front) light-station, Sandy Hook, New Jersey.—Height lowered 6 feet, February, 1897.

Squan Inlet, seacoast of New Jersey.—Name of station changed to Sea Girt, February, 1897.

Barataria Bay light-station, Louisiana.—Height of light increased 17½ feet, March 1, 1897.

Shutes Folly Island Spit beacon light, No. 3, Charleston Harbor, South Carolina.—Characteristic changed from white to red, March 15, 1897.

Cherry Island Range (front) light-station, Delaware River, Delaware.—Characteristic of light changed by the insertion of a red sector, March 15, 1897.

Ashtabula Range (rear) light-station, Lake Erie, Ohio.—Characteristic changed to two lens-lantern lights instead of three, as heretofore, March 29, 1897.

Old Plantation Flats light-station, Chesapeake Bay, Virginia.—Changed from a fifth to a fourth-order light, April 7, 1897.

Two Harbors light-station, Lake Superior, Minnesota.—Color of light changed from red to white, April 10, 1897.

Two Harbors Breakwater light-station, Lake Superior, Minnesota.—Color of light changed from white to red, April 10, 1897.

Sturgeon Bay Canal Northwest Entrance light, No. 2, Wisconsin.—Color changed from white to red, April 15, 1897.

Sturgeon Bay Canal Northwest Entrance to Cut light, No. 3, Wisconsin.—Color changed from white to red, April 15, 1897.

Milwaukee light-station, Lake Michigan, Wisconsin.—Characteristic of light changed from fixed white, varied by a white flash every 45 seconds, to fixed white, varied by a white flash every 30 seconds, May 12, 1897.

Tiger Island South Range lights, Fernandina entrance, Florida.—Color of each light changed to fixed white, May 15, 1897.

Chapel Hill Range Cut buoy, New York Lower Bay, New York.—Changed from a gas-lighted to an electric-lighted buoy, June 14, 1897.

Bailey Harbor Range (front) light, Lake Michigan, Wisconsin.—Changed from a sixth-order to a reflector light, June 27, 1897.

CHANGES IN FOG SIGNALS.

During the fiscal year the following changes were made in fog signals:

Smith Point light-vessel, Chesapeake Bay, Virginia.—Characteristic of steam whistle changed to sound blasts of 5 seconds' duration, separated by silent intervals of 55 seconds, July 16, 1896.

West Quoddy Head light-station, Maine.—Characteristic of steam whistle changed to sound blasts of 3 seconds, separated by silent intervals of 57 seconds, August 11, 1896.

Great Duck Island light-station, Maine.—Characteristic of steam whistle changed to sound blasts of 2 seconds, separated by silent intervals of 28 seconds, August 11, 1896.

Matinicus Rock light-station, Maine.—Characteristic of steam whistle changed to sound blasts of 3 seconds, separated by silent intervals of 27 seconds, August 11, 1896.

Whitehead light-station, Maine.—Characteristic of steam whistle changed to sound blasts of 3 seconds, separated by alternate silent intervals of 9 and 45 seconds, August 11, 1896.

Grindel Point light-station, Maine.—Changed from a hand bell to a 1,000-pound bell struck by hand, October 3, 1896.

Fire Island light-vessel, New York.—Characteristic of whistle changed to sound blasts of 3 seconds, separated by alternate silent intervals of 4 and 20 seconds, October 10, 1896.

Negro Island light-station, Maine.—Changed from a hand bell to a 1,000-pound bell struck by hand, October 20, 1896.

Eastern Point light-station, entrance to Gloucester Harbor, Massachusetts.—Fog signal changed to a 4,000-pound bell operated by a small steam engine, December 3, 1896.

West Quoddy Head light-station, Maine.—Characteristic of steam whistle changed to sound blasts of 3 seconds, separated by one silent interval of 7 seconds and two each of 22 seconds' duration, January 8, 1897.

Matinicus Rock light-station, Maine.—Characteristic of steam whistle changed to sound blasts of 5 seconds, separated by silent intervals of 25 seconds' duration, January 8, 1897.

Cedar Point light-station, Chesapeake Bay, Maryland.—Characteristic of bell changed to strike a single blow every 30 seconds, January 15, 1897.

St. Joseph Pierhead light-station, Lake Michigan, Michigan.—Changed from a bell struck by machinery to a 10-inch steam whistle, February 1, 1897.

Manana Island, fog-signal station, Maine.—Characteristic of Daboll trumpet changed to sound blasts of 2 seconds' duration, separated by silent intervals of 13 seconds, March 30, 1897.

Petit Manan light-station, Maine.—Characteristic of steam whistle changed to sound blasts of 3 seconds' duration, separated by alternate silent intervals of 9 and 45 seconds, April 3, 1897.

Mount Desert light-station, Maine.—Characteristic of Daboll trumpet changed to sound blasts of 3 seconds' duration, separated by silent intervals of 17 seconds, April 3, 1897.

Conanicut Island light-station, Narragansett Bay, Rhode Island.—Fog bell changed to sound a double blow every 10 seconds, June 1, 1897.

CHANGES IN LOCATION.

During the fiscal year the following-described changes in location were made:

Great Salt Pond Breakwater bell buoy, Block Island Sound, Rhode Island.—Moved 2,500 feet NNW. ¼ W., August 15, 1896.

Cape Fear River New Channel Range post lights, North Carolina.—Each moved 190 feet NW., August 26, 1896.

Stanwood post light, Washington.—Moved about 1 mile southwesterly from the Skagit River post light, September, 17, 1896.

St. John post light, Willamette River, Oregon.—Moved one-eighth mile westward from former location September 28, 1896.

St. Simon Range (front) beacon light-station, Georgia.—Structure carried away in a hurricane September 29; rebuilt on range line 15 feet in rear of former site, October 17, 1896.

Point Partridge bell buoy, Strait of Juan de Fuca, Washington.—Moved 1 mile westward from former location, October 3, 1896.

Outside Bar whistling buoy, Columbia River, Oregon.—Moved 1½ miles north-northwesterly from former location, October 15, 1896.

Nantucket New South Shoal light-vessel, No. 66, Massachusetts.—This vessel was permanently established about 17¼ miles southeasterly from former station, October 17, 1896.

Galveston Bar whistling buoy, Galveston entrance, Texas.—Moved three-fourths mile E. ⅝ N. from former location, October 20, 1896.

Frankfort Pierhead light-station, Lake Michigan, Michigan.—Light and fog-bell moved 600 feet, to outer end of pier, November 12, 1896.

St. Joseph Pierhead light, Lake Michigan, Michigan.—Moved 290 feet nearer the outer end of the pier, November 15, 1896.

Lower Quarantine Shoal post light, No. 7, St. Johns River, Florida.—Moved to a point 20 feet N. of the northerly end of the training wall running north from Quarantine Island, November 16, 1896.

Cleveland (east pier) light-station, Lake Erie, Ohio.—Moved about 121 feet SSE. ¼ E. to new east pier, November 18, 1896.

Cape Hatteras beacon light, North Carolina.—Moved 275 feet nearer Cape Hatteras light, and 25 feet to the westward, November 25, 1896.

Winter Quarter Shoal light-vessel, No. 45, seacoast of Virginia.—Moved three-fourths mile SE. from her former position, January 8, 1897.

Hilton Head Range (front) light-station, South Carolina.—Moved to a point 63 feet to the southward, January 9, 1897.

Knapp Landing post light, Columbia River, Washington.—Moved about 700 feet north-northwesterly from former position, February 17, 1897.

Barataria Bay light-station, Louisiana.—Moved about 840 feet E. by S. from old tower, March 1, 1897.

Conneaut Range (rear) light-station, Lake Erie, Ohio.—Moved to a point 815 feet S. by E. ⅝ E. in rear of pierhead light, March 1, 1897.

Entrance bell buoy, Cumberland Sound and Fernandina entrance, Florida.—Moved ⅜ mile southwesterly May 24, 1897.

Egg Rock light-station, Boston Bay, Massachusetts.—Moved to a temporary tower 55 feet SE. from old tower, June 25, 1897.

NEW BUOYS.

During the fiscal year the following-named special buoys were established:

East Bank gas buoy, No. 2, East Channel, New York Lower Bay, New York.—A gas-lighted buoy, August 5, 1896.

East Bank gas buoy, No. 4, East Channel, New York Lower Bay, New York.—A gas-lighted buoy, August 5, 1896.

Knoll bell buoy, Mobile Bay entrance, Alabama.—Experimental bell buoy, established August 21, 1896.

Bay State Shoal gas buoy, No. 5, St. Lawrence River, New York.—A gas-lighted buoy, August 24, 1896.

Empire Shoal gas buoy, No. 6, St. Lawrence River, New York.—A gas-lighted buoy, August 24, 1896.

Chapman Shoal gas buoy, No. 14, St. Lawrence River, New York.—A gas-lighted buoy, August 25, 1896.

Entrance bell buoy, entrance to Winyah Bay, South Carolina.—Reestablished December 19, 1896.

Chapel Hill Range Cut gas buoy, New York Lower Bay, New York.—A gas-lighted buoy, December 26, 1896.

Sewall Point bell buoy, Hampton Roads, Virginia.—Established January 11, 1897.

Milford Harbor bell buoy, Long Island Sound, Connecticut.—Established February 19, 1897.

Humboldt North Jetty bell buoy, entrance to Humboldt Bay, California.—Established February 24, 1897.

Lawson Reef bell buoy, Rosario Strait, Washington Sound, Washington.—Established April 3, 1897.

Ragged Point Spit gas buoy, No. 9, Potomac River, Maryland.—A gas-lighted buoy, April 7, 1897.

Ballard Reef Channel, Detroit River, Michigan.—Three gas-lighted buoys, April 8, 1897.

Inner End of Straight Cut gas buoy, No. 30, Maumee Bay, Ohio.—A gas-lighted buoy, April 12, 1897.

Mouse Rock bell buoy, Estero Bay, California.—Established April 18, 1897.

Erie Harbor Outer gas buoy, No. 2, Pennsylvania.—A gas-lighted buoy, April 24, 1897.

Poverty Island Shoal gas buoy, Lake Michigan, Michigan.—A gas-lighted buoy, May 5, 1897.

Gravelly Island Shoal gas buoy, entrance to Green Bay, Michigan.—A gas-lighted buoy, May 5, 1897.

Pollock Rip Slue gas buoy, entrance to Nantucket Sound, Massachusetts.—A gas-lighted buoy, May 7, 1897.

Fisherman Shoal gas buoy, Lake Michigan, Wisconsin.—A gas-lighted buoy, May 8, 1897.

Lansing Shoal gas buoy, Lake Michigan, Michigan.—A gas-lighted buoy, May 8, 1897.

Sapelo whistling buoy, entrance to Sapelo Sound, Georgia.—Established May 9, 1897.

Hen and Chickens (northeast) gas buoy, entrance to Larchmont Harbor, Long Island Sound, New York.—A gas-lighted buoy, May 25, 1897.

East Bank gas buoy, No. 6, New York Lower Bay, New York.—A gas-lighted buoy, June 14, 1897.

Coney Island Channel gas buoy, New York Lower Bay, New York.—A gas-lighted buoy, June 14, 1897.

BUOYS DISCONTINUED.

In the course of the fiscal year the following-named special buoys were discontinued:

Robbins Reef experimental bell buoy, New York Lower Bay, New York.—July 8, 1896.

Craney Island Flats (north end) bell buoy, Hampton Roads, Virginia.—Carried away in a gale October 11, 1896.

Charleston whistling buoy, entrance to Charleston Harbor, South Carolina.—April 6, 1897.

Seventeen-Foot Knoll gas buoy, No. 34, Delaware River, New Jersey.—May 14, 1897.

Baker Shoal gas buoy, No. 20, Delaware River, New Jersey.—May 14, 1897.

Tangier Island Shoal Lump gas buoy, Chesapeake Bay, Maryland.—May 18, 1897.

TEMPORARY CHANGES IN AIDS TO NAVIGATION.

The following temporary changes were made in aids to navigation during the fiscal year:

Middle beacon, Lake St. Clair, Michigan.—Structure rebuilt and light reestablished July 1, 1896.

Cornfield Point light-vessel, No. 48, Connecticut.—Light-vessel No. 48 was replaced on her station and light-vessel No. 20 withdrawn July 2, 1896.

Sand Island light-station, Alabama.—Fog-bell tower carried away by a gale July 6, 1896; tower rebuilt and fog bell reestablished January 13, 1897.

Sandy Hook light-vessel, New York.—Light-vessel No. 51 was replaced on her station and relief light-vessel No. 16 withdrawn July 10, 1896.

Trinity Shoal experimental whistling buoy, off the coast of Louisiana.—Established July 10, 1896.

Fenwick Island Shoal light-vessel, No. 52, Maryland.—Withdrawn for repairs and station marked by a whistling and a bell buoy July 14, 1896. Light-vessel replaced and whistling and bell buoy removed July 20, 1896.

Boston light-vessel, Massachusetts.—Light-vessel No. 54 withdrawn for repairs and relief light-vessel No. 39 placed on station July 15, 1896. Light-vessel No. 54 returned to station July 29, 1896. Light-vessel No. 54 was removed for repairs and relief light-vessel No. 39 placed on the station August 5, 1896. Light-vessel No. 54 returned to station and relief light-vessel No. 39 withdrawn August 13, 1896.

Smith Point light-vessel, Virginia.—Light-vessel No. 46 was replaced and gas buoy removed July 16, 1896.

Northeast End light-vessel, New Jersey.—Light-vessel No. 44 removed for repairs and station marked by a whistling buoy July 20, 1896. Light-vessel replaced and whistling buoy removed July 27, 1896.

Church Point light-station, Michigan.—Lens lantern light reestablished July 22, 1896.

Straitsmouth light-station, Massachusetts.—Moved to new tower 45 feet N. ¾ W. from temporary tower July 30, 1896.

Negro Island light-station, Maine.—Moved to new tower 40 feet WSW. ½ W. from the temporary tower July 31, 1896.

Gedney Channel experimental whistling buoy, New York Lower Bay, New York.—Established August 7, discontinued August 26, 1896.

Wreck of steamer Lizzie Henderson light, New York.—A lantern light established August 12, 1896. Wreck removed and light discontinued August 19, 1896.

Vineyard Sound light-vessel, Massachusetts.—Light-vessel No. 41 removed for repairs and relief light-vessel No. 39 placed on the station August 15, 1896. Light-vessel No. 41 returned to her station and relief light-vessel No. 39 withdrawn January 24, 1897.

Mosher Ledge experimental bell buoy, entrance to New Bedford Harbor, Massachusetts.—Established August 28, 1896; discontinued September 12, 1896.

Mobile Ship Channel Lower gas buoy, Alabama.—Dragged out of position September 8; replaced September 16, 1896.

Wreck of unknown schooner, Raritan River, New Jersey.—A lantern light established on wreck September 12, 1896; discontinued October 27, 1896.

St. Simon Range Front beacon light station, Georgia.—Structure carried away in a hurricane September 29, 1896; temporary lantern light established; structure rebuilt and reflector light reestablished October 17, 1896.

Little Marsh Island post light, No. 4, Florida.—Structure demolished and light extinguished September 29, 1896; reestablished October 3, 1896.

Lower Quarantine Shoal post light, No. 7, Florida.—Structure carried away in a gale September 29, 1896; reestablished October 8, 1896.

Cape Charles light-vessel, No. 49, Virginia.—Broke adrift in a gale October 11, 1896; replaced November 11, 1896.

Bush Bluff light-vessel, Virginia.—Dragged from her position October 11; replaced October 12, 1896.

Broken part of Pollock Rip (north part) bell buoy, entrance to Nantucket Sound, Massachusetts.—Broke adrift in gale of October 13; replaced in position October 16, 1896.

Pollock Rip light-vessel, No. 47, Massachusetts.—Broke adrift in a gale October 13; replaced in position October 16, 1896. Broke adrift during a gale December 16; replaced December 19 and again December 21, 1896.

Scotland light-vessel, New Jersey.—Light-vessel No. 7 removed for repairs and relief light-vessel No. 16 placed on her station and fog signal changed to bell struck by hand October 15, 1896. Forward lantern disabled by collision and two lantern lights exhibited November 20, 1896. Light-vessel No. 7 replaced November 30, 1896, and relief light-vessel No. 16 withdrawn.

Dame Point Dredged Cut post light, No. 16, St. Johns River, Florida.—Carried away by a steamer October 15; structure rebuilt and light reestablished November 7, 1896.

Brigantine Shoal whistling buoy, seacoast of New Jersey.—Reported out of position October 19; replaced on station November, 1896.

Quicks Hole bell buoy, Vineyard Sound, Massachusetts.—Bell buoy replaced by an experimental bell buoy October 20; former bell buoy reestablished November 20, 1896.

Lower Mile Point Cut post light, M 2, St. Johns River, Florida.—Damaged and light extinguished October 20; reestablished November 9, 1896.

Gedney Channel experimental whistling buoy, New York Lower Bay, New York.—Established October 28; discontinued December 11, 1896.

Martins Industry light-vessel, South Carolina.—Light-vessel No. 1 permanently withdrawn and replaced temporarily by relief light-vessel No. 29, November 1, 1896. Relief light-vessel No. 29 sounds a bell struck by hand instead of a 12-inch steam whistle. Relief light-vessel No. 29 withdrawn and light-vessel No. 53 placed on station December 23, 1896.

Mobile Ship Channel beacon light, No. 29, Mobile Bay, Alabama.—Carried away by an unknown vessel November 3; reestablished November 21, 1896.

Gedney Channel and Bayside Range Channel electric buoys, New York Lower Bay, New York and New Jersey.—Lights extinguished by accident November 5; relighted November 6, 1896. Damaged by collision and lights extinguished November 13; relighted November 17, 1896, excepting electric buoy No. 7 was made to show an oil-lantern light; electric lights reestablished November 18, 1896; extinguished, owing to damage by ice, February 2; relighted February 8; extinguished March 24; relighted March 26, 1897.

Swan Island Bar (lower) post light, Willamette River, Oregon.—Structure carried away by freshet and light extinguished November 16; structure rebuilt and light reestablished December 21, 1896.

Swan Island Bar (upper) post light, Willamette River, Oregon.—Structure carried away by freshet and light extinguished November 16; structure rebuilt and light reestablished December 21, 1896.

Superior Bay Channel (upper middle) and Superior Bay Channel (upper) post lights, Minnesota.—Structures carried away by ice and lights extinguished November 16, 1896; reestablished on the opening of navigation, 1897.

St. Louis Bay West Range, North and South Channel post lights, Minnesota.—Structures carried away by ice and lights extinguished November 16, 1896; reestablished on the opening of navigation, 1897.

Coon Island post light, Willamette River, Oregon.—Structure carried away by freshet and light extinguished November 17; structure rebuilt and light reestablished December 21, 1896.

Little River whistling buoy, off Little River, Cutler Harbor, Maine.—Reported not sounding November 18; replaced by buoy in good order December 12, 1896.

San Francisco Outside Bar whistling buoy, entrance to San Francisco Harbor, California.—Reported not working November 23; put in working order November 30, 1896.

Robinson Point light-station, Puget Sound, Washington.—Steam fog whistle discontinued for repairs to machinery from November 30 to December 9, 1896.

Frying Pan Shoals light-vessel, No. 1, off the seacoast of North Carolina.—Broke adrift December 2; replaced in position December 5, 1896.

Hen and Chickens light-vessel, Massachusetts.—Light-vessel No. 2 withdrawn for repairs and relief light-vessel No. 9 temporarily placed on the station December 7; light-vessel No. 2 replaced on station December 31, 1896, and relief light-vessel No. 9 withdrawn.

Sturgeon Bay Canal, Northwest Entrance to Cut, Light No. 3, Michigan.—Structure carried away by ice December 11, 1896; reestablished 12 feet high, on a float, on the opening of navigation, 1897.

Winter-Quarter Shoal light-vessel, No. 45, seacoast of Virginia.—This vessel broke adrift during a gale December 15, 1896; replaced on her station January 8, 1897.

Chatham Bar whistling buoy, off seacoast of Massachusetts.—Went adrift in a gale of December 16; replaced on station December 21, 1896.

Northeast Slue Channel whistling buoy, Pollock Rip Slue, seacoast of Massachusetts.—Broke adrift in gale of December 16; replaced on station December 21, 1896.

Broken part of Pollock Rip (north part) bell buoy, easterly entrance to Nantucket Sound, Massachusetts.—Broke adrift December 16; replaced on station December 21, 1896.

Great Round Shoal light-vessel, No. 42, Massachusetts.—Broke adrift during a gale December 16; replaced December 24, 1896.

Nantucket Shoals light-vessel, No. 66, Massachusetts.—Broke adrift during the gale of December 16; replaced December 20, 1896. Broke adrift February 3; replaced in position February 8, 1897.

Succonnesset Shoal light-vessel, No. 6, Nantucket Sound, Massachusetts.—Broke adrift during a gale December 16; replaced December 22, 1896.

Point Partridge bell buoy, Strait of Juan de Fuca, Washington.—Reported adrift December 24, 1896; replaced in position January 12, 1897.

Mobile Ship Channel Upper gas buoy, Mobile Bay, Alabama.—Light found extinguished December 28, 1896; relighted February 22, 1897.

Mobile Ship Channel Lower gas buoy, Mobile Bay, Alabama.—Light found extinguished in January; relighted February 22, 1897.

San Luis Obispo bell buoy, San Luis Obispo Bay, California.—Reported not working January 6; put in order January 18, 1897.

Elbow of Ledge gas buoy, No. 14, Delaware Bay, New Jersey.—This buoy was removed for refilling January 15; replaced January 22; reported missing January 28; replaced on its station February 7, 1897.

Wreck of Alvena light, entrance to New York Lower Bay, New Jersey.—Two fixed red lantern lights established on the wreck January 20; one light discontinued May 1, 1897.

Mobile Ship Channel, First Bend beacon light, Mobile Bay, Alabama.—Structure destroyed by passing vessel and light extinguished January 27; rebuilt and light reestablished March 17, 1897.

Plum Beach light-station, Narragansett Bay, Rhode Island.—A temporary lantern light, February 1, 1897.

Ediz Hook light-station, Strait of Juan de Fuca, Washington.—Fog bell disabled and not struck from February 15 to February 26, 1897.

Barataria Bay light-station, Louisiana.—A lens-lantern light established February 17; discontinued March 1, 1897, and fourth-order light reestablished.

Swan Island Bar (lower) post light, Willamette River, Oregon.—Carried away by passing steamer and light extinguished February 18; structure rebuilt and light reestablished March 8, 1897.

Point No Point light-station, Puget Sound, Washington.—Fog bell discontinued for repairs from March 1 to March 15, 1897.

Ram Island light-station, entrance to Boothbay Harbor, Maine.—Fog-bell machinery reported disabled, repaired March 2; disabled March 20, and repaired March 26, 1897.

Newton Rock bell buoy, Narragansett Bay, Rhode Island.—Damaged by collision March 6; replaced by new buoy March 11, 1897.

Barnegat Shoal bell buoy, seacoast of New Jersey.—Reported March —, about 1 mile SSW. from its proper position with the bell not ringing; replaced on its station May 7, 1897.

Bantam Rock whistling buoy, off Boothbay Harbor, Maine.—Reported adrift March 8, replaced by another buoy March 11, 1897.

Mosher Ledge, entrance to New Bedford Harbor, Massachusetts.—Experimental bell buoy established March 17, 1897.

Mobile Ship Channel Sixth Bend beacon light, Mobile Bay, Alabama.—Structure destroyed and light extinguished March 19; structure rebuilt and light reestablished March 26, 1897.

Race Rock light-station, entrance to Long Island Sound, New York.—The fog siren disabled March 22, repaired and working April 7, 1897. While siren was disabled a bell was struck.

Wreck of the E. A. Stevens light, Raritan River, New Jersey.—Established March 25; wreck removed and light discontinued March 29, 1897.

Sail Rock whistling buoy, entrance to Quoddy Roads, Maine.—Reported disabled March 30, replaced by another buoy April 12; reported adrift April 30, replaced on station May 20, 1897.

Galveston light-vessel No. 28, Texas.—Moved ⅝ mile E. ½ S. from her former position April 1; moved ⅞ mile to the westward from her recent position June 3, 1897.

Cape Flattery light-station, entrance to Strait of Juan de Fuca, Washington.—Steam fog whistle discontinued during repairs from April 10 to June 15, 1897.

Outside Bar whistling buoy, entrance to San Francisco Bay, California.—Reported not sounding April 12; put in working order April 16, 1897.

Halfway Rock whistling buoy, Casco Bay, Maine.—Reported not sounding April 16; replaced by another buoy April 23, 1897.

Annisquam Harbor light-station, Massachusetts.—Fifth order light moved to temporary tower 55 feet E. ¼ N. from old tower April 23. (Reestablished in new tower 55 feet W. ¼ S. from temporary tower July 13, 1897.)

Cornfield Point light-vessel, No. 48, Long Island Sound, Connecticut.—During repairs light changed to fixed white and sounding of fog signal suspended May 5; characteristics of lights and fog signals restored May 8, 1897.

Head of Passes West Jetty light-station, Mississippi River, Louisiana.—Structure fell May 12, 1897, and a temporary lantern light is now shown practically in the same position.

Herson Island upper light, No. 9, St. Clair River, Michigan.—Moved nearer to Herson Island middle light, No. 8, May 15, 1897.

Mobile Ship Channel beacon light, No. 6, Mobile Bay, Alabama.—Moved to structure No. 16 of the permanent system of lighting May 20, 1897.

Mobile Ship Channel Third Bend beacon light, Mobile Bay, Alabama.—Moved to structure No. 3 of the permanent system of lighting May 20, 1897.

Dog River Bar beacon light, No. 1, Mobile Bay, Alabama.—Moved to structure No. 18 of the permanent system of lighting May 20, 1897.

Dog River Bar and Choctaw Pass Channel ranges (front for both) beacon light, No. 2, Mobile Bay, Alabama.—Moved to structure No. 20 of the permanent system of lighting May 20, 1897.

Lower Entrance beacon light, Lake St. Clair, Michigan.—Structure demolished by a steamer and light extinguished May 22; structure rebuilt and light reestablished May 29, 1897.

Tillamook Rock light-station, seacoast of Oregon.—Sounding of fog siren suspended for repairs from May 24 to May 30, 1897.

Trinity Shoal whistling buoy, coast of Louisiana.—Whistling buoy adrift and temporarily replaced by second-class nun buoy May 28; whistling buoy replaced in position June 11, 1897, and temporary buoy removed.

Five Fathom Bank light-vessel, No. 40, off the seacoast of New Jersey.—Removed for repairs and station marked by a whistling buoy June 5; vessel returned to her station and buoy withdrawn June 29, 1897.

Race Rock light-station, entrance to Long Island Sound, New York.—The fog siren was discontinued June 8, 1897; until further notice a bell will be struck by machinery.

Kitts Rock bell buoy, Portsmouth and Little Harbors, New Hampshire.—Reported out of order June 11; replaced by another buoy June 15, 1897.

Sandy Hook light-vessel, New York.—Light-vessel No. 51 removed for repairs and Relief light-vessel No. 16 temporarily placed on the station June 15. This vessel shows a reflector light flashing white every 15 seconds. (Light-vessel No. 51 returned to her station July 10, 1897, and Relief light-vessel No. 16 withdrawn.)

Moultrieville beacon light, No. 2, Charleston Harbor, South Carolina.—Structure carried away by passing vessel June 15; rebuilt and light reestablished June 29, 1897.

Mobile Ship Channel beacon light, No. 27, Mobile Bay, Alabama.—Structure destroyed by an unknown vessel June 16; rebuilt and light reestablished June 29, 1897.

Humboldt Outside Bar whistling buoy, entrance to Humboldt Bay, California.—Moved about 1¼ miles north-northeasterly from its former position June 19, 1897.

Schuylkill River Range light-station, Pennsylvania.—Lens-lantern and sixth-order light temporarily discontinued and lantern lights established to the eastward June 30, 1897.

Mouse Rock bell-buoy, Estero Bay, California.—Reported not sounding June 30. (Put in working order July 8, 1897.)

Aids to navigation maintained by the Light-House Board, June 30, 1897.

Aids.	First district.	Second district.	Third district.	Fourth district.	Fifth district.	Sixth district.	Seventh district.	Eighth district.	Ninth district.	Tenth district.	Eleventh district.	Twelfth district.	Thirteenth district.	Fourteenth district.	Fifteenth district.	Sixteenth district.	Atlantic Coast.	Pacific Coast.	Lake Coast.	Western rivers.	Total entire coast, 1896.	Total entire coast, 1897.	Increase.
Electric lights	....	3	1	....	....	....	....	....	....	....	....	....	....	....	....	....	4	....	....	....	4	4	0
First-order lights	2	4	6	5	7	7	8	2	....	....	....	9	9	....	....	....	41	18	....	....	59	59	0
Second-order lights	7	3	1	....	....	1	....	3	1	....	2	1	....	....	....	....	15	1	3	....	19	19	0
Third-order lights	6	1	5	3	....	4	5	6	8	6	9	3	1	....	....	....	30	4	23	....	55	57	2
Three-and-a-half-order lights	....	2	....	....	....	....	1	....	3	1	4	....	....	....	....	....	3	....	8	....	10	11	1
Fourth-order lights	19	23	38	13	43	6	6	13	33	23	36	10	8	....	....	....	161	18	92	....	266	271	5
Fifth-order lights	25	16	20	8	22	4	1	14	15	6	15	5	2	....	....	....	110	7	36	....	151	153	2
Sixth-order lights	1	5	33	2	10	6	1	2	19	19	13	....	....	....	....	....	60	....	51	....	112	111	1
Lens lanterns	4	1	4	10	23	18	10	3	6	17	43	4	18	....	....	....	78	17	66	....	145	156	11
Range lenses	....	....	6	8	2	....	....	....	....	....	....	....	....	....	....	....	16	....	....	....	16	16	0
Reflectors	....	12	....	8	4	21	....	2	1	3	....	....	....	....	....	....	47	....	4	....	47	51	4
Tubular and other lanterns	4	9	135	7	16	137	21	53	16	2	78	7	92	539	517	360	382	99	96	1,416	1,972	1,993	21
Light-vessels in position	....	10	8	4	3	3	....	2	4	4	3	....	1	....	....	....	30	1	11	....	41	42	1
Electric-lighted buoys	....	....	11	....	....	....	....	....	....	....	....	....	....	....	....	....	11	....	....	....	10	11	1
Gas-lighted buoys	....	7	8	2	1	....	....	2	4	10	....	....	....	....	....	....	20	....	14	....	18	34	16
Total lighted aids	68	96	276	70	131	207	53	102	110	91	203	39	126	539	517	360	1,003	165	404	1,416	2,925	2,988	63
Fog signals operated by steam, hot air, or oil engines	13	11	20	6	4	2	....	1	30	7	29	15	12	....	....	....	57	27	66	....	137	150	13
Fog signals operated by clockwork	22	10	54	7	66	3	....	11	7	5	4	8	5	....	....	....	173	13	16	....	194	202	8
Day beacons	103	74	38	5	10	41	35	14	....	....	1	54	44	5	....	....	320	98	1	5	422	424	2
Whistling buoys	14	11	5	4	1	7	3	6	....	....	....	12	8	....	....	....	51	20	....	....	70	71	1
Bell buoys	19	17	28	6	2	16	5	3	....	....	2	9	5	....	....	....	96	14	2	....	106	112	6
Other buoys	667	513	581	164	1,150	283	261	113	101	140	374	68	270	....	....	....	3,732	338	615	....	4,665	4,685	20
Total unlighted aids	838	636	726	192	1,233	352	304	148	138	152	410	166	344	5	....	....	4,429	510	700	5	5,594	5,644	50
Total number of aids	906	732	1,002	262	1,364	559	357	250	248	243	613	205	470	544	517	360	5,432	677	1,004	1,421	8,519	8,632	113

Appropriations made at the second session of the Fifty-fourth Congress for the Light-House Establishment.

GENERAL PURPOSES.

Supplies for light-houses	$400,000
Repairs of light-houses	575,000
Salaries of light-keepers	710,000
Expenses of light-vessels	325,000
Expenses of buoyage	475,000
Expenses of fog signals	100,000
Lighting of rivers	300,000
Surveys of light-house sites	1,000

SPECIAL WORKS.

Ballard Reef light-vessel and two floating lights, Detroit River, Michigan	1,500
Bull Bay light-station, South Carolina	10,000
Cape San Blas light-station, Florida	4,500
Chequamegon Point light and fog-signal station, Wisconsin	1,500
Fire Island light-vessel, New York	40,000
Grand Marais Harbor of Refuge light-station, Michigan	2,000
New Haven Harbor Breakwater light and fog-signal station, Connecticut	25,000
Oil houses	5,000
Orient Point light and fog-signal station, New York	30,000
Overfalls Shoal light-vessel, New Jersey	80,000
San Francisco Harbor light-vessel, California	40,000
Staten Island light-house depot, New York	25,000
Tender for the Second light-house district	37,500
Tender for the Seventh and Eighth light-house districts	37,500
West Bank light and fog-signal station, New York	50,000

NEW WORKS AUTHORIZED.

Congress authorized, by act approved on February 15, 1893, the establishment of a number of light-stations at an aggregated cost of nearly half a million dollars, but made no appropriation at that time for their construction. Since then from time to time appropriation has been made for the erection of many of them. The following is a list of the light-stations remaining for which no appropriation has yet been made, with the maximum amount which each may cost:

Bay State Shoal lights, New York	$800
Erie Harbor (Presqu'ile) fog signal, Pennsylvania	4,300
Fairport Harbor fog signal, Ohio	4,300
Lorain Harbor (Black River) fog signal, Ohio	4,300
Poe Reef light-vessel, Straits of Mackinac, Michigan	25,000
Sand Hills light-house, Michigan	20,000
Bayfield light and fog signal, Wisconsin	5,000
Pats (or Hat) Point light and fog signal, Minnesota	15,000
Ludington light and fog-signal station, Michigan, keeper's dwelling	4,500
St. Martin Island light, Michigan	15,000
Little Gull Island light and fog signal, Michigan	20,000
Peshtigo Shoal, Green Bay, Wisconsin	10,000
Wilson Harbor light, New York	2,500
Big Oyster Bed Shoal light and fog signal, New Jersey	25,000
Deer Point light, Florida	1,000
New York Slough light and fog signal, California	10,000
Mermenteau River light, Louisiana	7,000
Willamette River, Oregon, 25 beacon lights and buoys between Salem and Portland	5,000

The following-named stations were authorized by act approved March 2, 1897, but no amounts were named in connection with them:

Building a light-keeper's dwelling at Egmont Key light station, Florida.

Reconstructing the front beacon of Apalachicola Bay range-light station, Florida.

Establishing a light station at or near St. Joseph Point, in St. Joseph Bay, west coast of Florida.

Establishing range lights to mark the channel over the bar, entrance to Choctawhatchee Bay.

Repairing wharf and buildings at the depot at Key West, Fla.

The following-named work was authorized by the act approved February 6, 1897:

Pierhead light at South Milwaukee, Wis	$5,000

A detailed statement of the work done in each of the sixteen light-house districts is made in the body of the report under specified headings.

SUPPLIES OF LIGHT-HOUSES.

The appropriation for 1893, 1894, 1895, 1896, and 1897 was $385,000 for each year. While the appropriation for 1898 was $400,000, the number of light stations has been increased from 951 in 1893 to 1,116 in 1897, and it is reasonable to expect that appropriations will be made during the coming session of Congress for still other lights. To meet this increased demand for necessary supplies the Board has found it impossible, with the funds provided, to keep up its reserve stock of supplies to meet emergencies. This stock has been so heavily drawn upon, that to-day there are few stores on hand. The meagerness of preceding appropriations has made it necessary for the Board to cut down the quantity of supplies furnished yearly to the light-houses to such an extent that it can go no further without danger to the lights. In spite of the severe economy used, there is danger that the present lights and those which are being built can not be properly kept up without an increase of appropriation. The Board therefore estimates that $475,000 will be needed for providing supplies for light-houses during the coming fiscal year.

REPAIRS AND INCIDENTAL EXPENSES OF LIGHT STATIONS.

The estimate submitted under this head is $650,000. The appropriation for the current year is $575,000. From this appropriation must be paid the cost of repairs and maintenance of all shore stations, numbering now some 1,500, many of which are very old and therefore costly to maintain, as well as the cost of constructing beacon lights to mark the ends of pierheads, and at other localities on inland waterways and harbors. The law requires the Light-House Board to erect such beacon lights, but special appropriations for this purpose are not made, and estimates can not be submitted in advance, since the erection of these beacons usually depends upon the completion of piers and breakwaters or the completion or progress of other works of improvement made by the Government to inland waterways, which must be marked by suitable lights to render them available to commerce at night, as soon as they are opened to vessels. The cost of spare illuminating apparatus which must be kept on hand to replace that which may be damaged or destroyed in service is also paid from the appropriation for repairs and incidental expenses. Needed renewals of buildings at light stations can be done from the appropriation for general repairs if this is made sufficient, and special estimates for this purpose are therefore not submitted. The amount asked is urgently needed for the efficient and economical maintenance of the service.

The following memorandum relative to the improvement of existing aids to navigation, which the Board at its session on June 7, 1897, ordered to be sent to each light-house district officer for report and recommendations, sets forth in general terms the more important needs of the service in the way of increased efficiency:

* * * * * * *

"While radical changes in the general system of established aids to navigation are at no time advisable, it is evident that a considerable portion of the illuminating and fog-signal apparatus now in use is not up to date, and should be improved or replaced by a more effective apparatus of modern design as the appropriations may permit."

* * * * * * *

"As indicating in a general way the nature and scope of the report desired, the following notes of modifications which seem to the Board desirable are appended."

ILLUMINATING APPARATUS.

"The general system should be as simple as practicable, consistent with necessary distinguishing characteristics for individual lights, and the number of 'orders' of lights should be reduced rather than increased."

"Exclusive of river lights and range lights, the great majority of light stations might be brought under the classification of first order, third order, fourth order, and lens lanterns. Simplicity and uniformity in materials of supply are especially desirable."

"Double and multiple lights should be replaced by single lights when practicable."

"The order of light, the necessary range of visibility, and the height of the light above the water level should be made consistent where they are not so now."

"Fixed lights, especially fixed white lights of the higher orders, should be replaced by lights of more distinctive characteristics and greater luminous range."

"The luminous power and range of lights of the same order and different characteristics should be brought to a nearer approach to uniformity."

"Such modifications should be made as will reduce the probability of a characteristic appearing different at different distances or in different conditions of the weather. Such defects now exist in all fixed lights varied by flashes, and to a certain extent in lights showing both red and white flashes, or other combinations of red and white light."

"Modifications should be made to shorten the time required for a light to display a complete characteristic where this time is now more than one-half minute for lights of the higher orders, though lights of lower orders in channels and inland waters should require less time for a complete period as a general rule."

"In the higher orders, on the other hand, serious objections have developed to a characteristic involving exceedingly short flashes separated by considerable intervals of time."

"The question of red sectors would also be affected by this inquiry, especially where it may be desirable to change a fixed light to flashing, since colored sectors with flashing lights are not entirely satisfactory. Such sectors may perhaps be omitted in some cases, or something suggested as a substitute."

"At many stations the characteristic of the light is interfered with by an interior reflection in the lantern. This may be of sufficient importance to justify rebuilding the lantern or adopting other remedies."

"On account of the well-known defects of combinations in the same light of colored and white rays and flashes, it may be advisable in certain cases to do away with such combinations, and use 'group-flashing' or 'pulsating' lights of one color to obtain necessary distinction characteristics."

"In many cases it may be practicable to utilize the optical apparatus now on hand in connection with improved revolving machinery and mountings."

"Suggestions in regard to increasing the power and efficiency of lamps and burners and the use of improved methods of illumination are also desired."

DAY MARKS.

"In connection with the subject of improvements in lights, modifications in the colors of towers and other structures, and in the shape and color of unlighted beacons and other day marks should also be taken up."

FOG-SIGNAL APPARATUS.

"As in the case of lights, the general aim in modification of fog-signal apparatus should be to secure simplicity in the system and uniformity of apparatus so far as may be consistent with other more important considerations."

"The importance of this part of the subject is indicated by the fact that the fog signals, as a class, constitute the most unsatisfactory aids to navigation now maintained by the Light-House Establishment, although this is largely due to inherent difficulties which can not be entirely removed by improved apparatus."

"In the case of bells it has been shown by the experiments of Major Livermore that greatly increased efficiency may be obtained by the use of larger bells and greater power in the striking apparatus."

"It will probably be advantageous in some cases to substitute striking apparatus operated by small engines for the apparatus operated by weight, and in this latter marked improvements over the machine now quite extensively used have recently been made."

"For stations where the fresh-water supply is limited, steam and caloric apparatus may be replaced by oil engines."

"For stations requiring the most powerful signals, steam appears to possess certain advantages not yet secured in other agents. The principal improvements desired for steam fog signals are to diminish the time required to prepare the signal for operation, and at many stations to reduce the difficulties and cost of fuel supply."

"At important stations, where aberrations in the sound of fog signals have been noted, it is suggested that practical experiments in changing the location of the signal or otherwise modifying the local conditions might remove the difficulties where theory alone does not afford a remedy."

"Any other suggestions not referred to in these notes, which may have a bearing on the general subject of improving the aids to navigation, should of course be embodied in the reports called for."

The reports so far received in response to the above show that, in order to effect all the improvements desired, a large expenditure for new apparatus, etc., will be required, and the work will require some years for its full accomplishment.

In addition to the general improvements outlined, the Board has in contemplation an increase in the power, range, and efficiency of the illuminating apparatus at the more important seacoast lights of the first order. The principal seacoast lights of the United States are not in all cases fully up to the standard of luminous power that has been adopted by the foremost nations of the world. A sufficient appropriation is all that is needed to enable the Board to accomplish these improvements.

SALARIES OF LIGHT-HOUSE KEEPERS.

Congress appropriated by the sundry civil appropriation act of June 11, 1896, for salaries of light keepers $695,000. As this amount was insufficient, a further appropriation of $10,000 was made in the deficiency act of July 19, 1897. The combined amount, $705,000, was practically all expended for the purposes for which it was appropriated. On June 4, 1897, there was appropriated by the sundry civil appropriation act $710,000 for salaries of light keepers employed during the year which will end on June 30, 1898. It is not certain yet that this amount will suffice, as at the beginning of the fiscal year 1,292 keepers were on duty, and the number increases as the Light-House Establishment finishes and puts into commission light-stations, for the building of which Congress has made appropriations. Then it is fair to suppose that Congress will make appropriation at the coming session of Congress for the establishment of yet other light-stations. The rapidly increasing demands of commerce have induced Congress to establish fog signals at numerous existing light-stations, and it seems probable that the number will be increased at the next session of Congress. It is necessary to employ another light keeper at each station to which a fog signal is added. Previous appropriations have been so small that the Board has been unable to increase the pay of light keepers in proportion as they gained in experience and increased in value. Hence the Board has been unable to retain reliable keepers or to secure proper men for important positions. Years ago the average pay of light keepers was fixed by statute at $600 per year. There are at the present writing, say, 1,300 keepers on duty. It would take $780,000 to pay them, if they received the average pay fixed by statute. The sum asked with which to pay the light keepers for the coming fiscal year can hardly be called an estimate, as it is reached by the addition of fixed and known items, and is the result of close calculation. Hence it is earnestly recommended that the amount asked, $730,000, be appropriated.

EXPENSES OF LIGHT-VESSELS.

Congress appropriated $300,000 to defray the expenses of light-vessels during this fiscal year, which ended on June 30, 1897. The appropriation was expended and many needed repairs went over to the next year for lack of funds. The appropriation for the year to end on June 30, 1898, was $325,000. The increase is barely sufficient to pay the cost of the five new light-vessels which have been or are to be established in that year, viz: Fire Island, New York, light-vessel, moored in position on July 17, 1897; Diamond Shoal, North Carolina, light-vessel, established on September 30, 1897; Umatilla Reef, Oregon, light-vessel, which is to be placed in position early in 1898; San Francisco Bar, California, light-vessel, which is to be established early in 1898, and Overfalls Shoal, entrance to Delaware Bay, light-vessel, which is still under contract and which is to be placed in position in the spring of 1898. It will cost about $6,000 a year to maintain each of these vessels. The Board has recommended in its estimates and annual report that appropriation be made for building three more relief light-vessels. It will cost at the rate of $6,000 a year to maintain them while on duty and about one-third of that while waiting orders. The wear and tear on the older light-vessels increases with their age, and it costs more each year to keep them in repair. While the new light-vessels when built are fitted with all the modern improvements, the Board is fitting certain of the older light-vessels with fog signals and like improvements, to bring them up to its present standard. The Board estimates, therefore, the expense of light-vessels for the ensuing fiscal year will be at least $400,000, and it is recommended that an appropriation of that amount be made therefor.

EXPENSES OF BUOYAGE.

Congress appropriated by the act of June 11, 1896, for expenses of buoyage $430,000, together with $4,000 with which to establish gas buoys in the St. Lawrence River. Congress further appropriated by the deficiency act approved on July 19, 1897, the sum of $10,000 for expenses of buoyage for the year which ended on June 30, 1897, and these several amounts were duly expended for the named purposes. On June 4, 1897, there was appropriated in the sundry civil appropriation act $475,000 for expenses of buoyage, together with $25,000 for the establishment of gas buoys on the Great Lakes and connecting waters for the fiscal year which will end on June 30, 1898. These amounts will be fully expended for the named purposes. There are now some 4,900 buoys of all kinds in position. The buoys which were carried away or sunk at their moorings during the past year were replaced from the stock held in reserve, and that reserved stock lacks much of being fully replaced because of lack of funds. The Board will therefore need a larger appropriation than heretofore, not only to meet the immediate and increasing wants of commerce, but to bring up its stock of reserve buoys to its normal condition. The Board was unable to moor buoys at certain places for which request had been made, not because they were not needed, but because the appropriation therefor was insufficient. Funds are needed to maintain buoys after they are established. It is estimated that it will require $550,000 to defray the expenses of buoyage during the coming year, and it is recommended that an appropriation of this amount be made therefor.

EXPENSES OF FOG SIGNALS.

The appropriation for this important part of the service was $100,000 for the past year. Notwithstanding that the number of fog signals has been constantly increasing under special appropriations made by Congress for new light and fog-signal stations, and by the establishment of fog signals at existing light-stations under the authority of law and to meet the growing demands of commerce, the annual appropriation for the maintenance of these signals has been quite inadequate for a number of years past. While there will be for many years to come a demand for additional lights as well as fog signals in waters where the full commercial development is yet to be realized, the improvement now most needed in the way of direct aids to navigation where the system of lights is approaching completion is more effective fog signals. In these localities by far the larger portion of the accidents to vessels take place during thick weather, when the lights are not effective and when audible signals alone are available. The conditions are now such that it is impossible to maintain the service in a proper condition and to replace obsolete apparatus and make other urgently needed improvements at existing stations without increased appropriations for this purpose.

In the earlier development of sound signals for maritime purposes the United States led the world, and the majority of appliances now in general use for this purpose originated in this country and were first used by the Light-House Board. Important improvements have since been made, however, and many of them by officers in the Light-House Service of this country, which the Board has been unable to apply for lack of funds. Some of the improvements which are urgently needed and which could now be made are more efficient quick-steaming boilers, auxiliary heaters, for stations using steam signals, to facilitate starting the signal when needed and to afford greater economy in operation; compressed-air apparatus operated by oil engines for stations where the water supply is deficient, and improved striking apparatus to render fog bells more effective.

It is therefore recommended that the appropriation for fog signals be made $150,000, which is regarded as a very conservative estimate.

LIGHTING OF RIVERS.

The appropriation of $300,000 made at the last session of Congress was barely sufficient to maintain the post lights which had already been established; and it was insufficient to enable the Board to establish and maintain other lights which it is evident are much needed. It is estimated that $350,000 will be required to defray the expenses of lighting rivers during the next fiscal year, and it is recommended that an appropriation of this amount be made therefor.

NEW LIGHT-STATIONS AND DEPOTS.

The estimates for special appropriations for new light-stations and depots have been revised with particular care to bring them up to date and to make them conform to the actual needs of navigation in the various districts throughout the coast and inland waters. Several estimates formerly submitted for special appropriations to rebuild or renew existing structures have been omitted, as such work can be done more advantageously under the general appropriation for repairs, provided the latter be made sufficient, and the special estimates are thereby reduced to a minimum.

NEW LIGHT-VESSELS.

The Board has recommended in the proper places in the body of this report that appropriations be made for building a light-vessel for Cape Lookout Shoals, North Carolina, three relief light-vessels and two small, inexpensive light-vessels to be used on the Lakes. Each is much needed, but attention is especially invited to the urgent necessity for the relief light-vessels.

NEW TENDERS.

Recommendations are made in the proper place in this report that appropriations be made for the construction of two light-house tenders for use in the Third light-house district, to take the place of vessels now there, which are so nearly worn out that they can only last if used with care until new vessels can be built to take their places. Recommendations are also made that proper sums be appropriated for a new tender for the Ninth light-house district and another for the Tenth light-house district, as the tenders now in use in those districts are too small, too slow, and too costly to run, being old and lacking in economical modern improvements.

LIGHT-HOUSE EXHIBIT AT THE TENNESSEE CENTENNIAL EXPOSITION, HELD AT NASHVILLE, TENN., IN 1897.

In compliance with the instructions of the Treasury Department of February 27, 1897, the Board prepared and sent to Nashville an exhibit of the Light-House Establishment as follows:

One revolving lens, showing flashing light of the first order.
One revolving lens, showing flashing light of the third order.
Model of Fowey Rocks (Florida) light-station.
Model of a gas-lighted buoy.
Model of a river light.
Model of a whistling buoy.
Models of Minots Ledge (Massachusetts) light-station.
Models of Spectacle Reef (Michigan) light-station.
Models of light-vessels.
A fog-bell striking machine.
A locomotive headlight.
Three light-vessel lens lanterns.
An 8-day white-light lantern.
A 1-day red-light lantern.
A lens lantern with 5-day attachment.
A first-order lamp.
A fog bell.
A lantern and lamp for an electric spar buoy.
A light-house library.

There were also sent a large number of accessories to the foregoing named articles, which are two numerous to mention.

This exhibit was prepared and shipped from the General Light-House Depot, and upon its arrival at Nashville it was unpacked and set up by employees of the Staten Island lamp shop, who were detailed for the purpose by the Board.

The exhibit was fully installed on May 1, 1897, the opening day of the exposition.

During the continuance of the exposition the light-house exhibit was in the charge of regular light-house keepers, who were detailed for the purpose upon the recommendation of the district light-house inspectors, as a mark of appreciation of faithful services. These details were as follows:

Samuel Wright, keeper North Brother Island (New York) light-station, from May 17 to June 28, 1897.

Milton Reamey, keeper of Minots Ledge (Massachusetts) light-station, from June 28 to August 28, 1897.

Charles Kimball, keeper of White Fish Point (Michigan) light-station, from August 28 to October 30, 1897, when the exposition was formally closed.

Mr. J. C. Nash, clerk in the office of the Light-House Board, a resident of Tennessee, was deputed to represent the Board and was present from May 1 to May 17, the date of the formal opening of the Government building at the exposition.

Upon the close of the exposition the light-house property was repacked and returned to the Staten Island depot.

OIL HOUSES.

The Board again recommends that appropriation be made for the erection of small inexpensive structures near to, but separate from light-houses, in which to keep a year's supply of mineral oil, the illuminant now most used by the Light-House Establishment. An appropriation of $5,000 was made for that purpose for the current year.

It is estimated that $10,000 will be needed and can be profitably expended in building oil houses during the coming fiscal year, and the appropriation of that amount is therefore recommended.

THE FLAG AT LIGHT STATIONS.

The Board, in session on October 1, 1894, decided that it would take measures as soon as practicable to display the United States flag from each light-house. A committee was directed to formulate a plan and estimates for carrying the decision into effect. The committee recommended that two flags, one 10 feet and the other 6 feet long, with proper serving halyards, be furnished to each light station.

It is estimated that $10,000 can be profitably used for this purpose during the coming year, and it is recommended that an appropriation of this amount be made therefor.

INCREASED ACCOMMODATIONS FOR THE OFFICES OF THE LIGHT-HOUSE BOARD.

In previous years recommendation has been made and several times repeated that an appropriation be granted for a separate building for the offices of the Board. Separate buildings have been provided for a number of bureaus of the Treasury and other Departments whose requirements in this respect are certainly not greater than those of the Light-House Establishment.

The urgent demands for sufficient funds to maintain the direct aids to navigation and the conditions necessitating that appropriations be limited to the lowest possible figures have resulted in omitting the recommendation for a new building for the past few years. The business of the Board's office has, however, continued to increase, and the crowded condition and general inadequacy of the rooms now occupied, which are scattered about in various localities in the Treasury Department building, now require that the recommendation for proper office accommodations be renewed and in still more urgent terms. If an appropriation for this purpose be not deemed expedient, possibly a suitable building could be rented, or a building already owned by the Government might be made available for the purpose. An additional advantage would result from procuring necessary accommodations for the Light-House Board elsewhere in relieving to some extent the pressure for increased office room for other bureaus in the Treasury building.

INCREASE OF CLERICAL FORCE.

The clerical force employed in the Office of the Light-House Board has not been increased for many years. During this time the work that the force is required to do has been more than doubled.

The Department has recognized the fact that the Board was unable to do this work with the force provided by law, and it has detailed clerks to it from other offices from time to time. The detail has been decreased from five clerks, as it was several years ago, down to one clerk, as it is now.

The Board has recommended, in its annual estimates, that the clerical force be increased, as it feels unless this is provided that it will be unable to keep its work up to its own high standard.

ESTIMATES OF GENERAL APPROPRIATIONS.

Supplies of light-houses	$475,000.00
Repairs of light-houses	650,000.00
Salaries of light keepers	730,000.00
Expenses of light-vessels	400,000.00
Expenses of buoyage	550,000.00
Expenses of fog signals	150,000.00
Lighting of rivers	350,000.00
Survey of light-house sites	1,000.00
Oil houses for light-stations	10,000.00
Flags and flagstaffs at light-stations	10,000.00
	3,326,000.00

ESTIMATES FOR SPECIAL APPROPRIATIONS.

White Head light-station, Maine, keeper's dwelling	$3,400.00
Boon Island light-station, Maine, keeper's dwelling	3,400.00
Whitlocks Mill light-station, Maine	250.00
Cape Elizabeth light-station, Maine, keeper's dwelling	2,000.00
Little River Head fog signal, Maine	10,500.00
Burnt Coat Harbor light-station, Maine, roadway	500.00
Isles of Shoals light-station, New Hampshire, fog signal	5,500.00
Narraguagus light-station, Maine, additional land for boat slip	150.00
The Sisters, Sheepscot River, Maine, day mark	400.00
Halibut Rock, Maine, day mark	325.00
Matinicus Rock light-station, Maine, keeper's dwelling	3,200.00
Buckle Island light and fog-signal station, Maine	14,000.00
Pollock Rip light and fog-signal station, Massachusetts	80,000.00
State Ledge light and fog-signal station, Massachusetts	42,000.00

Sankaty Head light-station, Massachusetts, roadway	$300.00
Plum Beach light and fog-signal station, Rhode Island, for completion	9,000.00
New Haven Harbor Breakwater light and fog-signal station, Connecticut, completion	50,000.00
Hart Island light-station, Long Island Sound, New York, fog signal	2,500.00
Black Ledge light and fog-signal station, Connecticut	45,000.00
Hog Island Shoal light and fog-signal station, Rhode Island	35,000.00
Jeffreys Hook light and fog-signal station, New York, enlarging	1,400.00
Iona Island fog-signal station, New York	1,200.00
Esopus Island fog-signal station, New York	1,200.00
Greens Ledge light and fog-signal station, Connecticut	60,000.00
Pecks Ledge light and fog-signal station, Connecticut	10,000.00
Long Beach beacon light-station, Connecticut	2,500.00
Norwalk Harbor lighted beacons, Connecticut	600.00
Battery fog-signal station, New York, N. Y	3,600.00
Tender for the engineer of Third light-house district	85,000.00
Tender for the inspector of Third light-house district	95,000.00
Staten Island light-house depot, New York	25,000.00
Cape May light-station, New Jersey, keeper's dwelling	4,000.00
Relief light-vessel for Fourth light-house district	80,000.00
Edgemoor light-house depot, Delaware, keeper's dwelling, etc	5,000.00
Reimbursement of losses of seamen in Fourth light-house district	127.25
Hooper Island light and fog-signal station, Maryland	60,000.00
Ragged Point light and fog-signal station, Virginia	20,000.00
Dollers Point Range lights, and Hog Island light, James River, Virginia	2,000.00
Rappahannock River, additional lights, Virginia	3,300.00
Cape Lookout Shoals light-vessel, North Carolina	80,000.00
Relief light-vessel for Fifth light-house district	80,000.00
Lazaretto Point light-house depot, Maryland, keeper's dwelling	2,500.00
Cape Fear light-station, North Carolina	70,000.00
Cape Fear River range lights, North Carolina	3,105.00
Inside Passage beacon lights, Georgia and Florida	4,000.00
Depot for Sixth light-house district	35,000.00
Reimbursement of losses of light-keepers in Sixth district	2,399.13
Hillsboro Inlet light-station, Florida	90,000.00
Egmont Key light-station, Florida, keeper's dwelling	3,500.00
Apalachicola Bay range light-station, Florida	7,000.00
St. Joseph Point light-station, Florida	15,000.00
Terra Ceia Bay beacons, Florida	2,100.00
Key West light-house and buoy depot, Florida, repairing	10,000.00
Sand Island light-station, Alabama, rebuilding	65,000.00
Cubits Gap fog-signal station, Louisiana, keeper's dwelling	2,500.00
Red Fish Bar light-station, Texas, reestablishing	8,000.00
Mermenteau River light and fog-signal station, Louisiana	7,000.00
Oyster Bayou light-station, Louisiana	5,000.00
Reimbursement of losses of light-keepers in the Eighth light-house district	2,603.62
Grand Traverse (Cat Head) light and fog-signal station, Michigan	5,500.00
South Milwaukee light-station, Wisconsin	7,500.00
Tail Point light and fog-signal station, Wisconsin	7,500.00
Fisherman's Shoal light and fog-signal station, Wisconsin	50,000.00
St. Martin Island light and fog-signal station, Michigan	15,000.00
Pointe aux Barques light and fog-signal station, Michigan	32,000.00
Escanaba fog-signal, Michigan	5,000.00
Michigan City fog signal, Indiana	5,500.00

Portage Lake light-station, Michigan, keeper's dwelling	$3,
Kewaunee light and fog-signal station, Wisconsin, keeper's dwelling	7,
Ludington light and fog-signal station, Michigan, keeper's dwelling	4,
Tender for the Ninth light-house district	85,
Depot for Ninth light-house district near northern end of Lake Michigan	15,
Toledo Harbor light and fog-signal station, Ohio	75,
Grassy Island Range (Ecorse) light-station, Michigan, keeper's dwelling	5,
Grosse Isle North Channel Range light-station, Michigan, keeper's dwelling	3,
Grosse Isle South Channel Range light-station, Michigan, keeper's dwelling	5,
Chapman Shoal light and fog-signal station, St. Lawrence River, New York	25,
Oak Point range lights, St. Lawrence River, New York	10,
Depot for the Tenth light-house district	35,
Tender for the Tenth light-house district	85,
Lake St. Clair light and fog-signal station, Michigan	20,
Middle Island light and fog-signal station, Michigan	25,
Mud Lake light-station, Michigan	3,
Head of St. Marys River range lights, Michigan	1,
Crisps Point light and fog-signal station, Michigan	18,
Rock of Ages light and fog-signal station, Michigan	50,
Eagle River light-station, Michigan, moving to Sand Hills	20,
Poe Reef light-vessel, Straits of Mackinac, Michigan	15,
Martins Reef light-vessel, Lake Huron	15,00
Depot for the Eleventh light-house district in the vicinity of Sault Ste. Marie, Michigan	15,0
Cape Mendocino light-station, California, keeper's dwelling	5,50
Point Hueneme light-station, California, right of way	3,00
Santa Barbara light-station, California, keeper's dwelling and tower	7,50
Point Pinos light-station, California, land	2,00
Quarry Point fog-signal station, California	6,00
Pigeon Point light-station, California, site	5,00
Point Arguello light and fog-signal station, California	35,00
New York Slough light and fog-signal station, California	10,000
Point Sur light-station, California, keeper's dwelling	6,000
Point Buchon light and fog-signal station, California	33,000
Relief light-vessel for the Twelfth and Thirteenth light-house districts, Pacific Coast	80,000.
Point No Point light-station, Washington	6,000.
Point Brown beacon light and fog-signal station, Puget Sound, Washington	6,000.
Battery Point light and fog-signal station, Puget Sound, Washington	6,000.
New Dungeness light-station, Washington, keeper's dwelling	4,000.
Cape Blanco light-station, Oregon, keeper's dwelling	4,500.
Robinson Point light-station, Washington, keeper's dwelling	3,000.
Slip Point light-station, Washington, fog signal	7,000.
Burrows Island light and fog-signal station, Washington	15,000.
Semiahmoo light and fog-signal station, Washington	25,000.
Tongue Point light-house depot, Oregon	5,000.

FIRST DISTRICT.

This district extends from the head of navigation on the St. Croix River, Maine, the northeastern boundary of the United States, to and including Hampton Harbor, New Hampshire. It embraces all aids to navigation on the seacoast of Maine and New Hampshire and on all tidal waters between the limits named.

Inspector.—Commander N. Mayo Dyer, United States Navy.

Engineer.—Maj. William R. Livermore, Corps of Engineers, United States Army.

In this district there are—

Light-houses and beacon lights	68
Day or unlighted beacons	103
Fog signals operated by steam or hot-air engines	13
Fog signals operated by clockwork	20
Fog signal operated by electricity	1
Whistling buoys in position	14
Bell buoys in position	19
Electric bell buoy	1
Other buoys in position	667
Steamer *Lilac*, buoy tender, and for supply and inspection	1
Steamer *Myrtle*, for construction and repair in the First and Second districts	1

NOTE.—The number preceding the name of a light-station in the First, Second, Third, Fourth, Fifth, Sixth, Seventh, and Eighth districts is that by which it is designated in the list of lights and fog signals on the Atlantic and Gulf coasts of the United States, corrected to June 30, 1897.

LIGHT-STATIONS.

1. Whitlocks Mill, on the south bank of the St. Croix River, Maine.—The following recommendation made in the Board's last three annual reports is renewed:

> A light was needed at this place to enable the steamers plying between Eastport and Calais, and especially towboats, to make the difficult turn at the Narrows, a few hundred yards above Whitlocks Mill. The Canadian Government maintains two lights on the left or Canadian bank of the river, and another light was needed on the right or American bank to make the navigation safe at this difficult turn. Hence a red light was, on July 15, 1892, shown from a tree as a temporary expedient. It is now proposed to purchase a site for this light. The owner of the land offers it at a reasonable price. It is estimated that its purchase, together with the legal expenses necessary to obtaining title and cession of jurisdiction, will cost not to exceed $250. Recommendation is made that an appropriation of that amount be made for this purpose, since, without the authority of Congress, the small structure required as a support for the light and to store oil and supplies can not be erected.

—. *Little River Head fog signal, Maine.*—This is the entrance to Cutler Harbor, which is a station of the Eastport, St. John, and Bay of Fundy pilots. Vessels entering the Bay of Fundy first make Libby Islands and then try to make Little River light. It is a harbor of refuge, and is used as such by vessels when they can get in. This, however, is impossible in thick weather without a more effective fog signal than the bell now on Little River Island. The steamer *Eduardo* was wrecked on Old Man Island in 1889, 2 miles south of Cutler Harbor, and proved a total loss. The crew, numbering 40 in all, were saved. She cost $285,000, and her master stated formally that he was of opinion that the accident would not have occurred had there been a proper fog signal at this point.

The Board recommended the establishment of a fog signal there in six annual reports. It is estimated that the establishment of such a signal would cost $10,500, and an appropriation of that amount is therefore recommended.

11. Narraguagus, entrance to Narraguagus Bay, Maine.—The boat slip is in a bad place for landing. It extends to a little more than half-tide and is hedged about with ledges, which it would be costly to remove. Delays in landing often occur. An excellent site for a new boat slip can be bought at a little to the north of the present one. It is estimated that such a site can be purchased for not exceeding $150. Recommendation is made that an appropriation of this amount be made therefor.

13. Prospect Harbor, entrance to Prospect Harbor, Maine.—A site was cleared and preparations were made to build a boathouse.

19. Great Duck Island, seacoast of Maine.—The characteristic of the fog signal was changed. Materials were landed and preparations were made to rebuild the barn. Various repairs were made.

21. Bass Harbor Head, entrance to Bass Harbor, Maine.—A brick fog-signal house was built. Minor repairs were made.

22. Burnt Coat Harbor, Swan Island, coast of Maine.—The boundary fence was rebuilt. Minor repairs were made. The following recommendation made in the Board's last three annual reports is renewed.

> This station is situated at the extreme end of the peninsula and is separated from the town by the harbor. In winter the harbor is sometimes filled with ice, so that communication with the town by water can not be relied upon; a roadway for the accommodation of the necessary travel between the public road and the light-station is therefore necessary. The owners of the adjacent land offer to convey right of way to the Government at a nominal price. It is estimated that the legal expenses of obtaining title and cession of jurisdiction to the land thus conveyed, together with the cost of building the road needed, will not exceed $500. Recommendation is made that an appropriation of this amount be made therefor.

—. Buckle Island, entrance to York Narrows, Maine.—The following recommendation made in several previous annual reports of the Board is renewed:

> The Board is informed that something more than 1,000 sailing vessels, carrying lumber, fish, hay, coal, granite, and general merchandise, annually use this passage.

There are also several lines of steamboats, some of which make two trips a day, carrying large numbers of passengers to and from Bar Harbor and other points along the shore, which would be benefited by lights on Buckle Island. In the early spring and late fall steamers, and especially sailing vessels, find it necessary to go through the passage during the night, when a light on Buckle Island would be of great assistance to them. It is further stated that several vessels have been cast away on Buckle Island, among them the schooner *Walter Scott*, which was wrecked in the winter of 1870. It is proposed, if the necessary appropriation is made, to place a white light with four red sectors, with a post range light 100 feet in front of the main light. It is estimated that these range lights can be established at a cost not exceeding $14,000, and it is recommended that an appropriation of this amount be made therefor.

23. Blue Hill Bay, on Green Island, Maine.—A boat-slip car was made. Minor repairs were made.

25. Deer Island Thorofare, on Mark Island, Maine.—A boat-slip car was made. Minor repairs were made.

30, 31. Matinicus Rock, on Matinicus Rock, off the southern entrance o Penobscot Bay, Maine.—The following recommendation, made in the Board's last six annual reports, is renewed:

> For more than twenty years, and until recently, the first assistant keeper was the on of the principal keeper, and the two lived together in one dwelling. The resignation of the principal keeper has broken up this arrangement. At this important tation, which has two second-order lights and a steam fog signal, a keeper and three ssistant keepers are employed. These are the only people living on this rock. Two of the assistant keepers, with their families, live in one double dwelling, and the principal keeper lives in a separate single dwelling. These three sets of quarters are adapted only to the accommodation of three families, and a fourth set of quarters is therefore urgently necessary for the third assistant.
>
> It is estimated that a proper dwelling can be built for $3,200, and recommendation is made that this amount be appropriated for that purpose.

32. Two Bush Island, entrance to West Penobscot Bay, seacoast of Maine.—The buildings of the station, for which contract was made, are well advanced.

NOTE.—The light and fog signal were established on November 10, 1897.

33. Whitehead, on Whitehead Island, entrance to Penobscot Bay, Maine.—A new fog-signal boiler was installed. Minor repairs were made. This is an important station, having a third-order light and steam fog signal. There are three keepers, and the present accommodations are inadequate for them. It is estimated that a proper dwelling can be built for $3,400, and recommendation is made that this amount be appropriated therefor.

34. Owls Head, Penobscot Bay, entrance to Rockland Harbor, Maine.—A boat car was fitted to the slip. Minor repairs were made.

38. Negro Island, entrance to Camden Harbor, Maine.—A thousand-pound bell, struck by hand, was established. Minor repairs were made.

39. Grindel Point, entrance to Gilkey Harbor, Maine.—A thousand-pound bell, struck by hand, was established. Minor repairs were made.

First District.

40. Dice Head, entrance to Castine Harbor, Maine.—A hand striker for the fog bell was set up.

41. Fort Point, at the mouth of the Penobscot River, Maine.—An oil house was built. Minor repairs were made.

46. Franklin Island, Muscongus Bay, entrance to St. George River, Maine.—An L was added to the dwelling. Minor repairs were made.

47. Pemaquid Point, entrance to Johns Bay, Maine.—An engine house was built of brick and two engines were purchased. Minor repairs were made.

48. Ram Island, entrance to Boothbay, Maine.—A thousand-pound fog bell, struck by machinery, was established. Minor repairs were made.

50. Cuckolds fog-signal station, off entrance to Boothbay, Maine.—Two fences were built for protection against the wind. Repairs were made.

52. Pond Island, mouth of the Kennebec River, Maine.—A boathouse was rebuilt. Minor repairs were made.

53. Perkins Island, Kennebec River, Maine.—Title was acquired to the island as a light-house site. Plans and specifications were prepared and contract was made for erecting the building. The station is to be completed by February, 1898.

54. Squirrel Point, Kennebec River, Maine.—Title to the land needed for a light-house site was acquired. Plans and specifications were prepared and contract was made for erecting the buildings. The station is to be completed by February, 1898.

55, 56. Doubling Point range lights, Kennebec River, Maine.—Title was acquired to the land needed for light-house sites. Plans and specifications were prepared and contracts were made for erecting the buildings. The station is to be completed by February, 1898.

57. Doubling Point, Kennebec River, Maine.—Title was acquired to the land needed for a light-house site. Plans and specifications were prepared and contract was made for erecting the buildings. The station is to be completed by February, 1898.

59. Seguin, off the mouth of the Kennebec River, Maine.—A boat-slip car was built. A small derrick was put up at the landing. Minor repairs were made.

61, 62. Cape Elizabeth, on Cape Elizabeth, Maine.—The following recommendation, made in the Board's last six annual reports, is renewed:

> Until the resignation of the principal keeper, about two years ago, his wife was an assistant keeper, so that there were but three families to be accommodated in the three single dwellings at the station. This arrangement is changed, and there are now four separate families at the station, and two families are crowded into a dwelling adapted in size and arrangement to only one family. The two towers are more than 900 feet apart; two of the dwellings are near the northeast and one near the southwest tower. A fourth dwelling is very urgently needed near the latter to properly and conveniently house in the severe winter weather of that climate the second of the two assistants who attends the light in it. Besides a first and a sec-

> ond order light, the station has a first-class fog signal, and an additional dwelling is imperatively needed in the best interests of the service.
>
> It is estimated that one can be built for $2,000, and it is recommended that an appropriation of this amount be made therefor.

64. Spring Point Ledge, Portland Harbor, Maine.—The work of building this structure by contract, which was begun in the last fiscal year, was completed and the light and fog-signal were established May 24, 1897.

70. Boon Island, seacoast of Maine.—The following recommendation was made in the Board's last six annual reports:

> There are at this station one keeper and two assistants, and but two sets of quarters in one double dwelling. The second assistant keeper has to board either with the family of the keeper or with that of the first assistant keeper. This forced arrangement is unsatisfactory to all, and is quite unfavorable to the retention of a second assistant of the needed qualifications. The station is isolated and exposed, the tower is tall, and this second-order light is an important one.
>
> A third dwelling, which is urgently needed, it is estimated can be built for $3,400. It is therefore recommended that an appropriation of this amount be made therefor.

72. Portsmouth Harbor, entrance to Portsmouth Harbor, New Hampshire.—A survey was made of the light-house reservation. The dwelling was moved to a new site and minor repairs were made.

77. Isles of Shoals, New Hampshire.—The following recommendation, made in the Board's last annual report, is renewed:

> The fog signal now on White Island at the Isles of Shoals light is a bell. It falls far short of being adequate to the needs of commerce. A more effective signal is required. It is estimated that this can be established here for $5,500, and it is recommended that an appropriation of this amount be made therefor.

REPAIRS.

Repairs more or less extensive were made during the year at the following-named stations:

3. Lubec Channel, Me.
4. West Quoddy Head, Me.
5. Little River, Me.
7. Libby Islands, Me.
8. Moose Peak, Me.
11. Narraguagus, Me.
12. Petit Manan, Me.
14. Winter Harbor, Me.
15. Mount Desert, Me.
16. Egg Rock, Me.
17. Crabtree Ledge, Me.
18. Baker Island, Me.
20. Bear Island, Me.
24. Saddleback Ledge, Me.
26. Goose Rocks, Me.
29. Heron Neck, Me.
30, 31. Matinicus Rock, Me.
35. Rockland Breakwater, Me.
37. Indian Island, Me.
42. Tennant Harbor, Me.
43. Marshall Point, Me.
44. Monhegan Island, Me.
45. Manana Island fog-signal station, Me.
49. Burnt Island, Me.
61, 62. Cape Elizabeth, Me.
63. Portland Head, Me.
66. Portland Breakwater, Me.
69. Cape Neddick, Me.
70. Boon Island, Me.
71. Whaleback, N. H.
73, 74. Seavys Island range lights, N. H.
75. Jerrys Point beacon light, N. H.
76. Frosts Point beacon light, N. H.
77. Isles of Shoals, N. H.

First District.

The Geranium.—This side-wheel steamer, which belonged to the ond light-house district, rendered good service in this district in d ering coal, painting and replacing buoys from July 1 to 16 and September 16 to October 26, 1896. She was assigned to this dis permanently on July 1, 1897. She replaced 11 buoys, change painted 4 spindles and tripods, landed 83 tons of coal at light-stat did 18 days' work at the depots, and in doing this steamed 1,464 r and consumed 102 tons of coal.

SECOND DISTRICT.

This district extends from Hampton Harbor, New Hampshire, to Elisha Ledge, off Warren Point, Rhode Island, but does not include either the harbor or the ledge. It embraces all aids to navigation on the seacoast and tide waters of Massachusetts excepting those on the Taunton River and that part of Mount Hope Bay lying within the State boundary.

Inspector.—Commander Francis M. Green, United States Navy, to January 2, 1897; since then Lieut. Commander H. G. O. Colby, United States Navy.

Engineer.—Maj. William R. Livermore, Corps of Engineers, United States Army.

In this district there are—

Light-houses and lighted beacons	79
Light-vessels in position	10
Light-vessels for relief	1
Day or unlighted beacons	74
Fog signals operated by steam or hot-air engines	11
Fog signals operated by clockwork	10
Gas-lighted buoys in position	7
Whistling buoys in position	11
Bell buoys in position	17
Other buoys in position	513
Ice buoys for winter use	11
Steamers *Verbena*, *Geranium*, and *Azalea*, buoy tenders and for supply and inspection	3
Steamer *Myrtle*, for construction and repair in the First and Second districts	1

LIGHT-STATIONS.

80. Newburyport Harbor, Plum Island, mouth of Merrimac River, Massachusetts.—A drain was laid. The barn and fuel house were rebuilt and minor repairs were made.

81. Newburyport Upper Harbor, Massachusetts.—A pipe well was sunk.

85. Annisquam Harbor, Massachusetts.—The tower and workroom were rebuilt on the same foundations. Minor repairs were made.

87, 88. Cape Ann, Thatcher Island, Massachusetts.—The railroad was extended and a car was furnished. Many repairs were made.

89. Eastern Point, entrance to Gloucester Harbor, Massachusetts.—A boat slip 130 feet long was built. A 4,000-pound bell, operated by a Shipman oil engine, was established. The covered way was rebuilt and extended. Minor repairs were made.

Second District.

91, 92. Baker Island, entrance to Salem Harbor, Massachusetts.—A wreck which obstructed the boat slip was broken up and removed. Minor repairs were made.

96. Marblehead, entrance to Marblehead Harbor, Massachusetts.—A covered way was built connecting the dwelling with the tower. The disused light-mast was removed. Various repairs were made.

97. Egg Rock, off Nahant, Massachusetts.—A contract was made on June 25, 1897, for rebuilding the dwelling and tower on the same foundations. Minor repairs were made.

98–101. Lynn Harbor lighted beacons, Massachusetts.—An appropriation of $2,000 was made by act approved June 11, 1896, for establishing lighted beacons in Lynn Harbor, Massachusetts, and the following-named lights were established:

White Rocks light.—Two fixed lantern lights, one red vertically above one white.
Black Rocks light.—A fixed red lantern light.
Sandy Point light.—A fixed red lantern light.
Black Marsh Channel light.—A fixed red lantern light.

112, 113. Spectacle Island range lights, Boston Harbor, Massachusetts.—The buildings were erected under contract and the lights were established on May 20, 1897.

—. *State Ledge, Boston Harbor, Massachusetts.*—The following recommendation, which has been made in the last seven annual reports of the Board, is renewed:

> The ship channel, from the Boston wharves to Nix Mate buoy, has no aids to navigation except buoys. Vessels find it very difficult in thick weather and at night to keep in the channel, and they are particularly perplexed to know just where to turn in the neighborhood of State Ledge and buoy No. 8, both in leaving and entering the harbor. Large excursion steamers, as well as steamers of the regular lines running out of Boston, frequently have to anchor in thick weather solely because they have no guide between Nix Mate buoy and the wharves. This greatly incommodes business men going and coming during the summer months when fogs are prevalent. The Board has recognized for a long time the necessity for a light and fog signal at this point, but has postponed action while the improvements in the channel of the harbor in charge of the United States engineers were in progress. Although these improvements have not yet been entirely finished, they are practically concluded in that vicinity, and the Board is of opinion that the time has arrived when a light and fog signal ought to be established near buoy No. 8, or at or near State Ledge. It is estimated that it will cost $42,000 to establish a light and fog signal at this point.

It is recommended that an appropriation of this amount be made therefor.

120. Duxbury Pier, Plymouth, Massachusetts.—A new gallery was made to the tower. Minor repairs were made.

124. Mayo Beach, at the head of Wellfleet Harbor, Massachusetts.—The bulkhead for the protection of the site was partly rebuilt.

126. Sandy Neck, entrance to Barnstable Harbor, Massachusetts.—Part of the bulkhead was rebuilt.

Second District.

——. *Pollock Rip, off Chatham, Cape Cod, Massachusetts.*—The number of vessels using the channel through Pollock Rip Shoals, and the value of the commerce passing through it, are not exceeded in any other locality on the coast of the United States. The need of additional aid to vessels arises from the dangerous shoals, swift tidal currents, and prevalence of fogs. It is estimated that a light and a fog signal can be established here for not exceeding $80,000, and it is recommended that an appropriation of this amount be made therefor.

140. Sankaty Head, Nantucket Island, Massachusetts.—The following recommendation, made in the Board's last annual report, is renewed:

> This station is now accessible only over an unimproved road across private property. The owner, whose land is crossed by this road, objects to allowing its further use unless the road is put in proper condition. It is estimated that this can be done for $300, and the Board recommends that an appropriation of this amount be made therefor, since the improvement will require the authority of Congress.

154. Edgartown, Vineyard Sound, Massachusetts.—A pipe well was driven. Damage to the bridge by a storm was repaired. Minor repairs were made.

155. East Chop, entrance to Vineyard Haven Harbor, Massachusetts.—An oil house was built; various repairs were made.

164. Dumpling Rock, off Round Hill, New Bedford Harbor, Massachusetts.—Preparations were made for establishing a Daboll trumpet, operated by an oil steam engine.

NOTE.—This signal was established on October 12, 1897.

167. Butler Flats, New Bedford Harbor, Massachusetts.—Contract was made for building the structure. The light and fog signal is to be established by the end of this year.

REPAIRS.

At each of the stations named below repairs, more or less extensive, were made during the year:

86. Straitsmouth, Mass.
90. Tenpound Island, Mass.
93. Hospital Point, Mass.
94. Fort Pickering, Mass.
95. Derby Wharf, Mass.
103. Minots Ledge, Mass.
105, 106. Boston, Mass
108. Narrows, Mass.
110. Deer Island, Mass.
111. Long Island Head, Mass.
118, 119. Plymouth (Gurnet), Mass.
121. Race Point, Mass.
123. Long Point, Mass.
127. Cape Cod, Mass.
128, 129, 130. Nauset Beach, Mass.
135. Monomoy Point, Mass.
142. Gay Head, Mass.
148. Bishop and Clerks, Mass.
149, 150. Hyannis, Mass.
156. West Chop, Mass.
157. Nobska Point, Mass.
168. Palmer Island, Mass.
171. Ned Point, Mass.
173. Wings Neck, Mass.

Second District.

LIGHT-VESSELS.

102. Boston light-vessel, No. 54, entrance to Boston Harbor, Massachusetts.—She remained on her station, except when absent under repair, in spite of a number of very severe gales. Her deck was calked and her windlass was repaired. She was hauled out on the ways and her bottom was scraped and painted. She was supplied with engineer stores, galley ware, and a dory. Her reflectors were resilvered. She was withdrawn for repair on July 15, 1896, and was replaced on July 29, 1896. Light-vessel No. 39 took her place in the interval.

134. Pollock Rip light-vessel, No. 47, off Chatham, Cape Cod, Massachusetts.—On the night of September 6, 1896, a schooner, in attempting to cross her bows, struck the light-vessel on her starboard bow, splitting the facing piece on the upper part of the stem, lifting the cathead, with its fastenings and the anchor, carrying away two stanchions, and doing other damage. She was repaired at the expense of the owners of the schooner. On October 12, 1896, during a gale, a heavy sea struck the ship, and the mooring chain parted at 35 fathoms. She anchored about 8 miles off Great Point, and was replaced and anchored on her station on October 16 by the light-house tender *Azalea.* The tender also recovered her moorings and moored her securely a week later. On December 16 she again broke adrift during a severe gale and anchored about 3 miles from Handkerchief light-vessel. On December 19, 1896, she was replaced on her station at single anchor. On the night of April 2, 1897, a schooner collided with this vessel, causing some damage, which can be repaired without bringing her into port. She was again run into on the night of April 30, but the damage done was slight. She was supplied with galley ware and engineer stores and her medicine chest was replenished.

136. Shovelful Shoal light-vessel, No. 3, off Monomoy Point, Cape Cod, Massachusetts.—This vessel remained on her station and no repairs were made. She was supplied with lightning rods, galley ware, boat mast, a head for the galley stove, and a new liberty boat.

137. Handkerchief light-vessel, No. 4, Nantucket Sound, Massachusetts.—This vessel remained on her station and received no repairs. From September 15, 1896, she showed an additional light from a lens lantern at the foremast head on a level with her lantern on the mainmast. She was supplied during the year with blocks, galley ware, blankets, linings, copper head, and deck iron for the galley stove, and the liberty boat was repaired.

138. Great Round Shoal light-vessel, No. 42, off Nantucket, Massachusetts.—In the gale of December 16, 1896, this vessel drifted a short distance from her station and was replaced by the light-house tender *Azalea.* She was supplied with marine glasses, galley ware, stovepipe, engineer stores, and a new liberty boat.

Second District.

141. Nantucket Shoals light-vessel, No. 66, about 42 miles to the southward and eastward of Nantucket, Massachusetts.—On July 6, 1896, light-vessel No. 66 was placed on this station and light-vessel No. 58 was towed to Staten Island. On October 11, 1896, during a gale, the ship parted her chain and drifted about 6 miles. The *Azalea* took her in tow, and on October 17 she was anchored on her new station, about 14½ miles SW. by W. from Asia Rip, Phelps Bank, and 17¼ miles SE. from her former position. During the great gale of December 16, 1896, she again went adrift, and on December 18 anchored off Nobska Point, losing 115 fathoms of chain. On December 21, 1896, she reached her station under her own steam. During the gale of February 3, 1897, she broke from her moorings and drifted about 65 miles until the gale moderated, when she steamed in, and on February 5 anchored off Falmouth. She steamed to New Bedford, coaled ship, and on the next day left for her station. Five doors of her masthead lantern were fitted with metal reflectors in place of reflecting prisms, which were broken during a gale. A Baird distilling apparatus was put in the ship in September, 1896. She was supplied during the year with side lights, a quadrant bracket, sheet copper, grate bars, lathe and tools, engineer stores, and like material. Her medicine chest was also replenished.

151. Cross Rip light-vessel, No. 5, Nantucket Sound, Massachusetts.—This vessel remained on her station, and no repairs were made. She was supplied with galley ware, lightning rods, boat masts, and a new suit of sails.

152. Succonnesset Shoal light-vessel, No. 6, Nantucket Sound, Massachusetts.—During the great gale of December 16, 1896, she dragged a short distance and was replaced by the light-house tender *Azalea*. Oilcloth for the cabin, galley ware, hose, and copper head for the stove were supplied.

161. Vineyard Sound light-vessel, No. 41, western entrance to Vineyard Sound, Massachusetts.—In August, 1896, this vessel was taken to New Bedford for repair. In September she was taken to Bath, Me., where extensive repairs were made to her boilers and hull. The following-named work was done: A new set of tubes was put in each boiler, a new crown sheet was furnished and fitted to each boiler, new throat sheets, new legs, and new fronts and door frames were furnished, the steam chimneys were overhauled and repaired, the fire tools were repaired, and iron lugs under the grate bars were supplied. The machinery of the engine was also overhauled and a new steam piston and rod were fitted, the crank-pin brasses were bored out, the valve motion was trued up and all valves were overhauled or renewed, new gauge cocks were furnished, also sea cocks, the piping to the water tanks was repaired, a new iron umbrella was put on the whistle dome, the whistle dome was put in thorough repair, a duplex steam pump was furnished, a new iron stack was supplied with guys, etc., a new bottom blow valve was supplied to each boiler, new bottom blow pipes were fitted, and the boilers were painted and covered with asbestos. The vessel was hauled out on the ways, her bottom cleaned and copper patched, new wheel blocks were supplied, new gratings and new lanyards were furnished to the rigging, the decks were calked, new lantern-house doors were fitted, new locks and hinges fitted to all the doors, a new galley stove and smoke pipe were fitted, and a new steam windlass was put in. The forecastle deck was extended aft to cover the windlass, galvanized iron stanchions, with chains, were placed on the top-gallant forecastle, the mainmast was taken out and scarfed, and the vessel was painted three coats. She was towed to Boston, and the *Azalea*, on January 24, 1897, replaced her on the Vineyard Sound station. She was supplied with transom cushions, chairs, galley ware, blankets, engineer stores, etc., her medicine chest was replenished, her reflectors were replated, and the blocks repaired. She also received a new liberty boat.

162. Hen and Chickens light-vessel, No. 2, entrance to Buzzards Bay, Massachusetts.—She remained on her station, except for repairs. On December 5, 1896, she was brought into New Bedford to stop a leak which had been troublesome for nearly a year. Repairs were made to her stem and hawse pipes and the leak stopped. She resumed her station December 31, 1896. She was supplied with galley ware, hose, and a new foresail.

Relief light-vessel, No. 9.—This vessel was on Hen and Chickens station from December 5 to December 31, 1896, while light-vessel No. 2 was under repairs at New Bedford. She was then taken in, the main deck was calked, the after and main pumps were overhauled and repaired, the sternpost was overhauled and repaired, the water tanks were cemented inside, and repairs were made to the windows of the lantern house. She was hauled out on the ways and her bottom was cleaned and the metal patched.

Relief light-vessel, No. 39.—This vessel was on Boston station from July 5 to July 30, 1896, and from August 14, 1896, to January 24, 1897; she was on Vineyard Sound station while light-vessel No. 41 was at Bath, Me., under repairs. She was then brought to New Bedford, and the following-named repairs were made: Her deck was thoroughly calked, a new governor was supplied to the whistle engine, the chimneys of both boilers were relined, two new tubes were put in the port boiler, the circulating pump was overhauled and repaired, the inspirator was put in complete repair, the fog-whistle engine was overhauled and new brasses for the crank and shaft were supplied, two new bottom blow valves were put in, two smokestack guys were supplied, the water tanks were cemented inside, the old foremast was removed and a new one, fitted with rigging, etc., was put in, and the whistle dome was repaired. The vessel was hauled out on the ways, her bottom cleaned, and the metal was patched. In June, 1897, repairs were made to her steam fog whistle, and on June 12 she was towed by the *Azalea* to the light-house depot at Staten Island, New York.

DAY OR UNLIGHTED BEACONS.

The spindle marking Avery Ledge, erected by the United States Engineers, was carried away in January and has not been replaced. This is not a light-house beacon. Many of the beacons in the district were painted during the year. The structures themselves are generally in good condition but repairs are needed to some of them.

Five Pound Island, Gloucester Harbor, Massachusetts.—The beacon was righted and riprap replaced.

Little Aqua Vitæ, Salem Harbor, Massachusetts.—The spindle was temporarily repaired.

Black Rocks Dolphin, Lynn Harbor, Massachusetts.—The heads of the outer piles were refastened.

Little Southwest Rock, mouth of Buzzards Bay, Massachusetts.—A spindle and day mark were set.

FOG-SIGNALS OPERATED BY STEAM OR HOT-AIR ENGINES.

87, 88. Cape Ann, Massachusetts.—This 10-inch steam whistle was in operation some 550 hours and consumed about 37 tons of coal.

102. Boston light-vessel, No. 54, Massachusetts.—This 12-inch steam chime whistle was in operation some 656 hours and consumed about 72 tons of coal; besides, for heating ship, etc., 68 tons in addition was used, making a total of 140 tons consumed.

105. Boston, Massachusetts.—This first-class steam siren was in operation some 528 hours and consumed about 127 tons of coal.

121. Race Point, Massachusetts.—This 12-inch steam whistle was in operation some 592 hours and consumed about 26 tons of coal.

127. Cape Cod, Massachusetts.—This first-class Daboll trumpet was in operation some 855 hours and consumed about 12 tons of coal.

134. Pollock Rip light-vessel, No. 47, Massachusetts.—This 12-inch steam chime whistle was in operation some 1,060 hours and consumed about 120 tons of coal; besides, for heating ship, etc., 38 tons in addition was used, making a total of 158 tons consumed.

138. Great Round Shoal light-vessel, No. 42, Massachusetts.—This 10-inch whistle, operated by compressed air, was in operation some 676 hours and consumed 4,275 gallons of mineral oil in the engines.

141. Nantucket New South Shoal light-vessel, No. 66, Massachusetts.—This 12-inch steam whistle was in operation some 1,058 hours and consumed about 166 tons of coal; besides, for electric lighting, 268 tons in addition was used, making a total consumption of 434 tons of coal.

Second District.

156. West Chop, Massachusetts.—This 10-inch steam whistle was in operation some 595 hours and consumed about 33 tons of coal.

161. Vineyard Sound light-vessel, No. 41, Massachusetts.—This 12-inch steam whistle was in operation 1,061 hours and consumed about 83 tons of coal; besides, for heating ship, etc., 53 tons in addition was used, making a total of 136 tons consumed.

BUOYAGE.

On October 11, 1896, a severe gale caused the dragging from their positions of Pollock Rip, Great Faun Bar, and Avery Ledge bell buoys and Point Allerton Bar, Davis Ledge, and Outer Bar buoys. In November Pollock Rip whistling buoy was lost and Hen and Chickens whistling buoy went adrift, but was recovered, coming ashore near Gay Head in a damaged condition. During the severe gale of December 16, 1896, the buoys in Pollock Rip Slue and the whistling buoy off Plymouth went adrift. On January 21, 1897, two experimental electric buoys were placed in Boston Harbor, one at Nix Mate and one at State Ledge. During the gale of February 3 several buoys were dragged from their positions, the bell buoy at Pollock Rip was lost, and the whistling buoy at Newburyport went ashore. In April the Outer Bar buoy at Newburyport was changed from a black and white striped buoy to a first-class nun, painted red, and the whistling buoy at Plymouth was changed from red to black and white perpendicular stripes. The buoys in the Merrimac River were also replaced in April. On May 1, 1897, a gas buoy was established in Pollock Rip Slue, on 16-foot shoal, about seven-eighths of a mile NE. by N. from Pollock Rip light-vessel. In June, 1896, two buoys in Lynn Harbor were discontinued. During this month the whistling buoy off Eastern Point went adrift, but was recovered by the *Verbena*. Several large buoys were recovered from places where they went ashore and had remained for some time. During the year the buoys in Pollock Rip Slue sustained some damage, being run into, as usual, by tows and vessels.

DEPOTS.

Woods Hole, Little Harbor, Massachusetts.—Repairs were made to the dwelling.

Lovells Island, Boston Harbor, Massachusetts.—No repairs were made.

Machine and lamp shop, Boston, Massachusetts.—Extensive repairs were made here to the fog-signal machinery and illuminating apparatus of stations in the First and Second light-house districts.

TENDERS.

The Geranium.—This side-wheel steamer returned July 18, 1896, from the First light-house district. On September 15, 1896, she again went to that district on temporary duty, but on October 29 returned to Boston. She was put out of commission on November 30, 1896, and remained at Woods Hole, Mass., until March 13, 1897, when a crew was shipped and she resumed her regular work. During the time she was employed in this district she changed 182 buoys and painted 16 beacons, delivered 283 tons of coal to stations, and 58 loads of supplies, and worked 71 days at the buoy depots. For 25 days she was under repairs. In June, 1897, repairs were made to the tender's guards and the braces under the guards. She was hauled out on the ways, and her bottom was cleaned and the copper repaired. Repairs were also made to the furnaces, water legs, and steam chest. She was supplied with grate bars, oilcloth, linen, galley ware, etc. Her medicine chest was replenished. She steamed some 4,929 miles, and consumed about 373 tons of coal. On June 30, she was sent to do duty in the First light-house district.

The Verbena.—This side-wheel steamer was constantly employed except during 35 days when she was under repairs. She changed or replaced 274 buoys and painted 11 beacons. She delivered to light-vessels and stations 351 tons of coal, besides delivering 66 loads of rations and supplies. She was employed 19 days at the buoy depot. In July, 1896, slight repairs were made to her boilers. In November she was hauled out on the railway and her bottom was scraped and the copper repaired. On March 15, 1897, repairs were made to her boiler. On April 23, she was sent to New York for the Grant Memorial parade, returning April 30 to Woods Hole light-house depot. In June her deck was caulked. She was supplied with blocks, cushions, an inspirator, galley ware, linen, marine glasses, a dory, rubber hose, etc. She steamed some 9,206 miles, and consumed about 966 tons of coal.

The Azalea.—This steel screw steamer was constantly employed except 25 days when under repairs. She changed or replaced 155 buoys, delivered 793 tons of coal to light-vessels and various stations, besides 165 loads of rations and supplies, and worked 21 days at the buoy depot. On July 6, 1896, she towed light-vessel No. 58 to the general light-house depot at Staten Island. On August 4 she towed relief light-vessel No. 39 from New Bedford and put her on Boston Station. On September 17, she was sent to New York for a distilling apparatus for light-vessel No. 66, which she carried out to that vessel, and her engineers worked 2 days putting it in the light-vessel. In October, 1896, she went on the ways and her bottom was scraped and painted and repairs were made to the boiler, a new brass radiator was put in the pilot house, and wire rope was fitted to the steering gear. In January, 1897, she towed Vineyard Sound light-vessel No. 41 from Boston, upon the completion of repairs at Bath, to her station and brought relief light-vessel No. 39 from Vineyard Sound Station to New Bedford. On

March 1 she was sent to the general light-house depot at Staten Island for chain and buoys, and on March 5 returned to Woods Hole. On April 7 she was hauled out on the ways and her bottom was scraped and painted. She left New Bedford on April 23 for New York to take part in the Grant Memorial parade. She returned on April 30 with a load of buoys, chain, etc., from the general light-house depot. On June 12 she towed relief light-vessel No. 39 from New Bedford to the general light-house depot and returned to Woods Hole on June 17, 1897, with a load of buoys, chain, and the like. She was supplied with mattresses, bedding, a patent log, grate bars, chain cable, compensating binnacle, blocks, galley ware, and barometer. Her medicine chest was replenished. She steamed some 11,531 miles, consuming about 1,060 tons of coal.

The Myrtle.—This screw steamer, used for construction, repairs, and general service in the First and Second light-house districts, steamed about 11,380 miles and consumed some 770 tons of coal. A new boom was made and put in place. A new propeller was put on; two staterooms were built in the forward cabin and dead lights were put in. Repairs were made to the search-light apparatus, machinery and piping, to the launch and working boat, and to the hull and shoe while in dry dock.

New tender for the Second light-house district.—An appropriation of $37,500 was made by the act approved June 4, 1897, for finishing the construction of, equipping, and outfitting, complete for service, a new steam tender, to be called the *Mayflower*, for buoyage, supply, and inspection in the Second light-house district. She will be ready for service early in November, 1897.

3

THIRD DISTRICT.

This district extends from Elisha Ledge, off Warren Point, Rhode Island, to a point on the coast of New Jersey opposite Shrewsbury Rocks, and includes the ledge and the rocks. It embraces all aids to navigation on the coasts of Rhode Island, Connecticut, and New York, and of New Jersey northward of the point opposite Shrewsbury Rocks, and on all tidal waters tributary to the sea or Long Island Sound between the limits named, together with the aids on Whitehall Narrows and on the United States waters of Lakes Champlain and Memphremagog.

Inspector.—Commander A. S. Snow, United States Navy.

Engineer.—Lieut. Col. William Ludlow, Corps of Engineers, United States Army, to March 19, 1897; since then Lieut. Col. D. P. Heap, Corps of Engineers, United States Army.

There are in this district—

Light-houses and beacon lights, including 96 post lights	248
Light-vessels in position	8
Light-vessels for relief	4
Day or unlighted beacons	38
Fog signals operated by steam or hot-air engines	19
Fog signals operated by clockwork	60
Electric-lighted buoys	11
Gas-lighted buoys	8
Whistling buoys in position	5
Bell buoys in position	28
Other buoys in position	581
Steamer *Armeria*, used for supplying the light-stations of the Atlantic and Gulf coasts	1
Steamers *John Rodgers* and *Cactus*, buoy tenders, and for supply and inspection of light-stations	2
Steamer *Gardenia*, buoy tender and for freight	1
Steamers *Mistletoe* and *Rose*, used for works of construction and repair of light-stations, fog signals, and day beacons	2
Steamer *Nettle*, for works of construction and repair on Lake Champlain	1
Steam launch *Daisy*	1

LIGHT-STATIONS.

177. Castle Hill, Rhode Island.—The 1,286-pound fog bell was replaced by one of 2,400 pounds. A new fog-bell hammer was furnished, the landing wharf was repaired, and material was delivered for cementing the cellar of the dwelling.

184. Prudence Island, Rhode Island.—The old Stevens fog-bell-striking machine was replaced by a new No. 4 Gamewell machine, and a new weight rod was furnished. Various repairs were made.

Third District.

185. Hog Island Shoal, Rhode Island.—The following recommendation, made in the Board's last annual report, is renewed:

> The light-vessel near this shoal is old and weak and is scarcely seaworthy. It would cost about $70,000 to replace her. A suitable light-house can be built there for $35,000. The recommendation made in the last annual report, that an appropriation of this amount be made therefor, is renewed.

189. Whale Rock, Rhode Island.—The old and worn-out Stevens fog-bell-striking machine was replaced by a No. 4 Gamewell machine.

192. Plum Beach, Rhode Island.—Work on the caisson for the foundation was begun by the contractor on July 13, 1896. It was completed and launched August 19, 1896, and settled on the site on September 12, 1896. The ironwork for the foundation cylinder was completed and delivered September 28, 1896, and that for the superstructure was completed and stored at the contractor's works January 4, 1897. The erection of the foundation cylinder to the top of the eighth course, in accordance with the modified contract dated December 9, 1896, was completed January 30, 1897, and on February 22, 1897, the placing of the 1,500 tons of riprap for the protection of the site was finished. A temporary red lantern light was on February 1, 1897, established on the completed foundation cylinder, and on June 1, 1897, a fog-bell signal consisting of a 1,028-pound bell struck by machinery a double blow every 30 seconds, was also established. Unexpected difficulties occurred in laying the foundation. Hence the station can not be completed for the amount of the original appropriation. It is estimated that it can be finished for not exceeding $9,000, and it is recommended that an appropriation of this amount be made therefor.

194. Conanicut Island, Rhode Island.—A small barn was built, the sea wall was repaired, solid steps were set in the face of the wall, and landing steps were made and fitted from the sea wall to the terrace. On June 1, 1897, the characteristic of the fog bell were changed to a double blow every 10 seconds instead of a double blow every 30 seconds.

201. Sassafras Point, Rhode Island.—About 100 tons of riprap were placed on the southeast side of the pier for its protection.

206. Block Island (S. E.), Rhode Island.—One fog-signal boiler was replaced by a 25-horsepower Fitzgibbon boiler, and material for additional repairs to the fog signals and buildings was delivered. Various repairs were made.

207. Great Salt Pond Breakwater beacon, Block Island, Rhode Island.—The establishment of a fifth-order light and a fog signal near the outer end of the breakwater, at an estimated cost of $2,500, will be commenced upon the completion of the breakwater.

208. Watch Hill, Rhode Island.—The grounds around the base of the tower were raised, graded, and seeded. The brickwork of the cellar windows of the dwelling was built up to the new grade, and various repairs were made.

Third District.

209. *Montauk Point, New York.*—The houses for the new fog signals be established were completed on April 24, 1897, and on June 19 the gines, tanks, compressors, automatic signals, and sirens were deliv-ed at the station. Various repairs were made.

211. *Latimer Reef, New York.*—The old Stevens fog-bell-striking achine was replaced by a new one. Minor repairs were made.

215. *New London Harbor, Connecticut.*—The improved fog signal, nsisting of two 3½-horsepower Hornsby-Akroyd oil engines, air com-essors, etc., operating the first-class Daboll trumpet, was installed ecember 21, 1896. Necessary material for converting the old fog-sig-l house into an oil house was delivered. Minor repairs were made.

—. *Black Ledge, New London Harbor, Long Island Sound, Connecti-t.*—The following recommendation, which was made in five recent nnual reports of the Board, is renewed:

> The necessity for establishing a light and an efficient fog signal in such a position to enable vessels to enter and leave the harbor of New London, Conn., has become ident, and especially so for the aid of those approaching from seaward.
>
> The numerous outlying shoals and ledges surrounding the entrance to this harbor ke the approach to it dangerous in thick weather. The location of the present w London light and fog-signal station is so far inside the obstructions as to be rtially ineffective as an aid for the purpose of safe navigation of this entrance. e commerce of the port of New London has so increased since the erection of the esent light as to change the conditions materially. In view of these facts and the rther fact that a naval station is in operation on the Thames River, which empties to New London Harbor, it is suggested that a light and fog-signal station be estab-hed on the southwest ledge on the eastern side of the entrance to New London arbor. Estimate is made that it can be done for $45,000. It is therefore recom-ended that an appropriation of that amount be made therefor.

217. *Scotch Cap post light, No. 1, Thames River, Connecticut.*—A dol-hin was carried away by ice; a new one was put up in its place.

218. *Cow Point post light, No. 4, Thames River, Connecticut.*—A dol-hin was put up to replace one carried away by ice.

219. *Ice House post light, No. 3, Thames River, Connecticut.*—A new olphin was put up.

223. *Long Reach post light (lower), No. 8, Thames River, Connecti-ut.*—The post was knocked down September 7, 1896, by the schooner *ary A. Randall.* It was reset March 27, 1897.

227. *Mohegan Dike post light, No. 14, Thames River, Connecticut.*—he post was carried away by ice February 23, 1897. It was reset April 7, 1897.

231. *Perche Rock post light, No. 13, Thames River, Connecticut.*—An ron post, with arms, was put up.

235. *Race Rock, New York.*—The second-class siren established Octo-er 20, 1896, was discontinued June 8, 1897, owing to the unsatisfac-ory working of the engine. It will be replaced by a Hornsby-Akroyd -horsepower oil engine. The station was furnished with some 401 tons f riprap for the protection of the pier, and with a new landing ladder.

Third District.

The opening of the lens door was enlarged to more readily admit the lamp.

—. *Oyster Pond (or Orient Point), New York.*—By the act approved June 4, 1897, an appropriation of $30,000 was made for a light and fog signal on the site of the beacon formerly standing at this point to guide through Plum Gut. They will be established as soon as practicable.

245. *Joshua Rocks post light, Connecticut River, Connecticut.*—The post was carried away by ice December 16, 1896. A new post was set up April 17, 1897.

247. *Meadows post light, Connecticut River, Connecticut.*—The post was carried away December 16, 1896. It was reset April 17, 1897.

249. *Deep River post light, Connecticut River, Connecticut.*—The post was carried away by ice December 16, 1896. The crib was rebuilt and the post reset May 14, 1897.

259. *Mouse Island (lower) post light, Connecticut River, Connecticut.*—The post was carried away. It was repaired and reset.

260. *Mouse Island (upper) post light, Connecticut River, Connecticut.*—The post was carried away by ice. It was repaired and reset.

268-269. *Press Barn Bar Range post lights, Connecticut River, Connecticut.*—The post was carried away by a freshet; was replaced.

279. *Southwest Ledge, Connecticut.*—An improved fog signal consisting of a second-class Daboll trumpet, operated by compressed air, was established on March 30, 1897. Minor repairs were made.

—. *Old New Haven, Connecticut.*—This old station, abandoned in 1877 upon the establishment of the Southwest Ledge light-station, was transferred to the War Department November 13, 1896.

—. *New Haven Harbor Breakwater, Connecticut.*—By the act approved June 4, 1897, an appropriation of $25,000 was made for a light and fog-signal station on the outer breakwater, entrance to New Haven Harbor, to mark the westerly entrance to the harbor, and authority was given by the same act to contract for a station in a sum not to exceed $75,000. Recommendation is therefore made that an appropriation of $50,000 be made for the completion of this work.

282. *Stratford Shoal, New York.*—The two Hornsby-Akroyd 3½-horse-power oil engines and two compressors for the improved trumpet fog signal were received, and one of the engines was delivered at the station.

283. *Port Jefferson East Breakwater Beacon, New York.*—The station was completed and a fixed red lantern light and fog signal were established August 10, 1896, on a structure erected on the northerly end of the east breakwater entrance to the harbor of Port Jefferson, south side of Long Island Sound. The fog-bell signal consists of a 1,261-pound bell, struck by machinery a double blow every 30 seconds. The frame of the bell was strengthened. The door on the north side of the tower was closed and one was built on the south side with a vestibule and storm door. Some 240 tons of riprap were furnished and placed for the protection of the pier.

Third District.

284. *Port Jefferson West Beacon, New York.*—This station was com-eted and a fixed white lantern light was established August 10, 1896, n the structure erected on the point of the beach on the westerly side f the entrance to the harbor of Port Jefferson, south side of Long land Sound.

287. *Bridgeport Breakwater, Connecticut.*—Experiments are in prog-ss at the General Light-House Depot with an electric motor gong pparatus to be used here. A fog signal, with sleeping quarters for a eeper, is to be established on the inner end of the east breakwater, at cost of $1,200. The work will be taken in hand at an early date.

—. *Norwalk Harbor, Long Island Sound, Connecticut.*—The following ecommendation, made in the Board's last annual report, is renewed:

> The proposed improvements to the aids to navigation in this harbor are rendered ecessary by the important commercial interests of this port and the progress with orks of harbor and channel improvement in this vicinity which are being prose-uted by the Government. It is proposed, therefore, to establish a light and fog-gnal station on Greens Ledge, Norwalk Harbor, which it is estimated will cost 0,000. It is recommended that an appropriation of this amount be made therefor.
>
> It is also proposed to establish a light and fog-signal station on Pecks Ledge, Nor-alk Harbor. It is estimated that this can be done for a sum not exceeding $10,000, nd it is recommended that an appropriation of this amount be made therefor.
>
> It is also proposed to establish a light on Long Beach Day Beacon, Norwalk Harbor. t is estimated that this work can be done for $2,500, and it is recommended that an ppropriation of this amount be made therefor.
>
> It is further proposed to establish lighted beacons at Round Beach, Fitchs Point, White Rock Reef, and Grassy Hammock, Norwalk Harbor, Connecticut. It is esti-ated that these beacons can be established for a sum not exceeding $600, and it is ecommended that an appropriation of this amount be made therefor.

301. *Execution Rocks, New York.*—Some 200 tons of riprap were placed on the northeast side of the site for its protection; a new lantern deck and lantern were fitted on the tower. The lens and revolving machinery were overhauled. The old fog-signal sirens were replaced by new. Various repairs were made.

—. *Hart Island, Long Island Sound, New York.*—The following recommendation, made in the Board's last annual report, is renewed:

> The red sector shown from Execution Rocks light station was established to guide vessels clear of the southern end of Hart Island. As this light is about 2½ miles distant from Hart Island, it fails of its object in thick weather. The proposed fog signal is needed by the extensive commerce using the eastern entrance to New York Harbor. It is estimated that it can be established for $2,500, and it is recommended that an appropriation of this amount be made therefor.

303. *Stepping Stones, New York.*—The old pallet rest for the fog-signal machine was repaired and a new one furnished.

305. *Whitestone Point post light, East River, New York.*—The lantern deck was covered with canvas in place of the old tin covering.

313. *Hell Gate post light, East River, New York.*—The roof of the tower was covered with tin, and a smoke arrester was fitted to the lens.

314. *Man-o' War Rock post light, East River, New York.*—On May 9, 1897, the steam tug *Morgan*, or the barge which she had in tow,

westerly side of the channel and Hudson River, was established Ap 26, 1897.

394. *Coxsackie, New York.*—Some 233 tons of riprap were placed the north side of the pier for its protection.

402. *Schodack Channel post light, Hudson River. New York.*—The c was rebuilt and a new post was set.

414. *Covells Folly post light, Hudson River, New York.*—The po which was carried off by freshets, was replaced March 31, 1897.

REPAIRS.

Repairs more or less extensive were made at the following-nam stations:

174. Sakonnet, R. I.
176. Beavertail, R. I.
180. Newport Harbor, R. I.
181. Rose Island, R. I.
182. Gull Rocks, R. I.
183. Gould Island, R. I.
186. Muscle Bed Shoals, R. I.
187. Bristol Ferry, R. I.
188. Borden Flats, Mass.
190. Dutch Island, R. I.
193. Wickford Harbor, R. I.
195. Warwick, R. I.
196. Conimicut, R. I.
197. Bullock Point, R. I.
202. Point Judith, R. I.
203. Block Island (north), R. I.
205. Block Island Breakwater (rear), R. I.
214. North Dumpling, N. Y.
216. Bailey Point post light, No. 2, Conn.
236. Little Gull Island, N. Y.
238. Plum Island, N. Y.
240. Cedar Island, N. Y.
241. Saybrook Breakwater, Conn.
250. Chester Rocks post light, Conn.
252. East Haddam Meadows post light, Conn.
253. Haddam Island (front) post light, Conn.
254. Haddam Island (rear) post light, Conn.
264. Dividend Pier (front) post light, Conn.
265. Dividend Pier (rear) post light, Conn.
266. Two Piers Channel (front) post light, Conn.
267. Two Piers Channel (rear) post light, Conn.
277. Horton Point, N. Y.
285. Old Field Point, N. Y.
286. Bridgeport Harbor, Conn.
288. Black Rock, Conn.
289. Penfield Reef, Conn.
290. Norwalk Islands, Conn.
291. Eatons Neck, N. Y.
292. Lloyd Harbor, N. Y.
293. Cold Spring Harbor, N. Y.
294. Stamford Harbor, Conn.
297. Great Captain Island, N. Y.
302. Sands Point, N. Y.
303. Stepping Stones, N. Y.
309. North Brother Island, N. Y.
315. Shinnecock Bay, N. Y.
333. North Hook Beacon, N. J.
339. Conover Beacon, N. J.
340. Chapel Hill Beacon, N. J.
353. Robbins Reef, N. Y.
354. Liberty Enlightening the Worl N. Y.
355. Governors Island post light, N. Y.
356. Princess Bay, N. Y.
357. Great Beds, N. Y. and N. J.
368. Stony Point, N. Y.
371. West Point, N. Y.
372. Danskammer Point, N. Y.
374. Esopus Meadows, N. Y.
380. Saugerties, N. Y.
389. Four-Mile Point, N. Y.
403. Mull Dike (lower end) post lig N. Y.
412. Bath Dike post light, N. Y.
413. Pleasure Island post light, N. Y.
1145. Maxfield Point, Vt.
1147. Newport Wharf, Vt.
1148. Windmill Point, Vt.
1154. Cumberland Head, N. Y.
1158. Bluff Point, N. Y.
1163. Juniper Island, Vt.
1166. Barber Point, N. Y.
1167. Crown Point, N. Y.

Third District.

LIGHT-VESSELS.

175. Brenton Reef light-vessel, No. 11, entrance to Narragansett Bay, Rhode Island.—The hull of this vessel is of wood. Her condition, after twelve years of continuous service on her station, is such that she will have to be taken off her station and thoroughly repaired before the approach of winter. She received during the year, hose, rope, paint, medicines, bedding, fuel, rations, and new sails. She is kept in good order.

185. Hog Island Shoal light-vessel, No. 12, Narragansett Bay, Rhode Island.—This vessel is old and worn. It is only by great care that she is kept on her station. There is no spare light-vessel in the district to take the place of this light-vessel, the two serviceable relief ships being reserved for more important stations. It will cost about $500 to give her such repair as will permit her retention on duty for another year. She received during the year a new mainsail, jib, and boatsails, a new caboose, paint, rope, a new boat, cooking utensils, and other stores.

212. Ram Island Reef light-vessel, No. 23, Fishers Island Sound, Long Island Sound, New York.—The wooden hull is in such good condition that no repairs will be required this year. She received new awnings, windsails, bedding, medicines, boat-covers, cooking utensils, paint, cordage, and other stores. She is well kept.

234. Bartlett Reef light-vessel, No. 13, off New London, Long Island Sound, Connecticut.—The wooden hull of this vessel is in fairly good condition. She received during the year a new caboose, rope, paint, bedding, canvas, crockery, and tableware.

276. Cornfield Point light-vessel, No. 48, off the mouth of the Connecticut River, Long Island Sound, Connecticut.—After having been repaired, this vessel was returned to her station on July 2, 1896, and relief light-vessel No. 20, which had replaced her, was withdrawn. The vessel was docked, cleaned, and painted; the metal and wood sheathing were raised on each side; the lantern house was enlarged; the fire-room floor was relaid and strengthened, and the engines and boilers, with their connections, received extensive repairs. She received engineer's supplies, a new gaff, oars, paint, and ship chandlery.

316. Fire Island light-vessel, No. 58, off Fire Island, Atlantic coast of Long Island, New York.—The fog signal on this vessel was changed to its present characteristic on October 10, 1896. The plans for the new light-vessel for this station, No. 68, which were well advanced at the close of the last fiscal year, were finished, bids were called for, and contract was awarded to the lowest bidder. By the act approved June 4, 1897, $40,000 was appropriated for finishing the construction of, equipping, and outfitting this vessel. She is to be completed in September, 1897, and will be placed on her station as soon as practicable. She has a steel frame, steel keel plate, steel bilgestrake, and steel sheerstrake, connected by diagonal plates from keel to sheerstrake, and is wood-planked from the keel up to the sheer line at the main deck, and from that point up to the spar deck is plated with steel plate. She is 112 feet long, 28½ feet broad, and 22 feet 1½ inches deep, and is capable of moving with her own steam power. Her main engine is of the vertical, inverted surface-condensing type, with a single cylinder, of 22 inches diameter, with 22 inches piston stroke, and has 350 indicated horsepower. Her screw propeller is about 8 feet in diameter and has four blades with pitch and area for an estimated speed of 8 knots. Her main boiler is cylindrical and single-ended, 12 feet 2 inches in diameter and 11 feet 3 inches long. She also has donkey boilers and engine, and is fitted with a distilling apparatus. Her electric plant consists of two 4-inch double cylinder engines with suitable generators and is intended not only to thoroughly light the interior of the ship but to run the flashing electric lights at the two mastheads. Her fog-signal machinery consists of a horizontal noncondensing steam engine about 5 inches diameter of cylinder and 6 inches stroke, able to make about 120 revolutions a minute, and is attached to the machinery for operating the Crosby steam chime whistle. Her gross tonnage under the main deck is about 350 tons. Her speed will probably be about 8½ knots.

NOTE.—This vessel was placed on her station on September 20, 1897.

318. Sandy Hook light-vessel, No. 51, off the entrance to New York Bay, New York.—After extensive repairs, this vessel was returned to her station on July 8, 1896, and relief light-vessel No. 16, which had temporarily marked the station, was withdrawn. She has a steel hull, a propeller for movement under steam, shows an electric light, and has a 12-inch steam whistle for operation during fog. There was no suspension of the electric light, except as stated, at any time during the year. Its distinctive character, both of intensity and eclipse, continues to give satisfaction. The services of the tenders are so ordered that the special needs of the vessel are supplied without the difficulties which were at first apprehended. She was taken from her station on June 15, 1897, to have her bottom cleaned and painted and to receive sundry small repairs. These consisted of new tubes and soft patches for her boilers, circulating and air pumps put in order, and valves overhauled and ground tight. Steam was passed through her outboard valves to destroy the life of marine parasites adhering to them within. She was returned to her station July 10, 1897. Light-vessel No. 16 as usual occupied her place while she was off for repair. During the year she was furnished with electric supplies, engineer's stores, medicines, ship chandlery, hose, and other stores.

319. Scotland light-vessel, No. 7, off Sandy Hook, entrance to New York Bay, New York.—She was withdrawn for repairs on October 16, 1896, and was replaced on November 30, 1896. Light-vessel No. 16 took her place. She received new metal, hawse-pipes, windlass, chain, stopper, and some carpenter work. Her machinery is in good condition, and with the exception of a small leak of long standing and a few evidences of decay around parts of her fastenings the hull is in no need of repair. She also received bedding, cooking utensils, hose, lumber, medicines, fire brick, blocks, paint, and ship chandlery.

Relief light-vessel, No. 19.—This vessel is kept at the New London light-house depot, where she is only in the way. She is worn out from age and decay, and could not be repaired for even temporary service except at an injudicious expense. It is proposed to dismantle her and sell her by auction, or, if needed, to turn her over for target practice to the Navy Department.

Relief light-vessel, No. 16.—This vessel is doing duty off Sandy Hook in place of light-vessel No. 51, which was brought in for repairs. She was placed on the station of the Scotland light-vessel, No. 7, from October 16 to November 30, 1896. On November 20 her forward lantern was disabled by collision, and was replaced by two red signal lanterns until she was brought in. She is in fair order, and, without accident, will be serviceable throughout the year. She is kept at the General Light-House Depot when not taking the place of some other light-vessel.

Relief light-vessel, No. 20.—This wooden vessel is kept at the New London depot for duty as a relief light-vessel in the eastern part of the district. Her condition is such that for occasional service during the year a small outlay will keep her in repair.

Relief light-vessel, No. 39.—This vessel, formerly on duty at several stations in the Second district, was towed from New Bedford, Mass., by the tender *Azalea*, of that district, and arrived at the General Light-House Depot on June 13, 1897.

NOTE.—On July 17, 1897, she relieved light-vessel No. 58, off Fire Island, N. Y.

DAY OR UNLIGHTED BEACONS.

All the day beacons in the district were painted during the year.

Halfway Rock, Narragansett Bay, Rhode Island.—A spindle surmounted by a barrel. The barrel has disappeared; it will be replaced.

Goat Island Shoal dolphin, Newport Harbor, Rhode Island.—A clump of five piles. An incandescent electric light is maintained on it by the Old Colony Steamboat Company.

Pomham beacon, Providence River, Rhode Island.—A stone tower surmounted by a black ball. The ball is missing, but will be replaced. The masonry needs to be repaired.

Castle Island beacon, Bristol Harbor, Rhode Island.—A stone tower surmounted by a red ball. The stone work needs repairs and the ball is missing. Both will receive early attention.

Allen Rock beacon, Warren River, Rhode Island.—A tower surmounted by an iron pointer. The tower and pointer are gone. They will be replaced. A small wooden building marks the rock at present.

Third District.

Sugar Reef, Fishers Island Sound, Connecticut.—An iron spindle with a conical cage. The spindle is bent and the cage gone. They will be restored.

East spindle, Fishers Island Sound, Connecticut.—An iron spindle with a cask. The cask is gone and will be replaced, and the spindle, now bent, will be straightened.

Wicopesset Rock, Lords Passage, Fishers Island Sound, Connecticut.—An iron spindle with a cask. The cask is missing and the spindle bent. They will be restored.

Ram Island Reef spindle, Fishers Island Sound, Connecticut.—An iron spindle with round red cage. It is in need of repairs, which it will receive.

Groton Long Point Reef beacon, Fishers Island Sound, Connecticut.—An iron spindle with a cage work in the form of an inverted cone. The cage has been carried away. It will be replaced.

Pulpit Rock spindle, on West Ledge, Fishers Island Sound, Connecticut.—An iron spindle and barrel on a boulder. The barrel has disappeared; it will be replaced.

Potter (or Seaflower) Reef beacon, Fishers Island Sound, Connecticut.—A square granite structure surmounted by an iron spindle and cage. The cage is gone; it will be replaced. Some 200 tons of riprap were placed to protect the beacon.

Success Rock beacon, near Sands Point, New York.—An iron spindle fitted in the rock. The spindle is bent; it will be straightened.

Black Ledge, New London Harbor, Connecticut.—A granite day beacon, surmounted by a red spindle and a cage in the shape of two cones joined at the vertices. The stonework needs repair.

Oyster Pond Reef, on the Eastern Rock, off Orient Point, Long Island, New York.—A cast-iron cylinder filled with concrete, surmounted by an iron shaft and square cage. A light and fog signal, authorized by Congress, will be established at the site of this beacon.

Sand Spit, Sag Harbor, New York.—An iron cylinder, surmounted by a spindle and square cage. The spindle and cage were demolished December 7, 1896, and were reestablished on June 3, 1897.

Old beacon, Passaic River, New Jersey.—A wooden beacon with one red and two black bands on a granite pier. It is so dilapidated and covered by an abutment of the railroad bridge as to be of no use to navigation.

FOG-SIGNALS OPERATED BY STEAM OR HOT-AIR ENGINES.

176. Beavertail, Rhode Island.—The 10-inch steam whistle, in duplicate, was in operation some 593 hours during the year, and consumed about 46 tons of coal.

202. Point Judith, Rhode Island.—The first-class steam siren, in duplicate, was in operation some 729 hours during the year, and consumed about 56 tons of coal.

Third District.

206. Block Island (SE.), Rhode Island.—The first-class steam siren, in duplicate, was in operation some 806 hours during the year, and consumed about 43 tons of coal.

209. Montauk Point, New York.—The first-class Daboll trumpet, worked by caloric engines in duplicate, was in operation some 550 hours during the year, and consumed about 4 tons of coal.

215. New London Harbor, Connecticut.—The first-class Daboll trumpet, worked by caloric engines in duplicate until December 21, 1896, and since then by Hornsby-Akroyd oil engines in duplicate, was in operation some 541 hours during the year, and consumed about 5 tons of coal during 430 hours' operation with caloric engines and 50 gallons of oil during 111 hours' operation with oil engines.

235. Race Rock, New York.—The second-class siren, operated by a Crossley oil engine, established October 20, 1896, and temporarily discontinued June 8, 1897, was in operation a total of 404 hours, and consumed 312 gallons of oil.

236. Little Gull Island, New York.—The second-class steam siren, in duplicate, was in operation some 565 hours during the year, and consumed about 37 tons of coal.

276. Cornfield Point light-vessel, No. 48, Connecticut.—The 12-inch steam whistle was in operation some 590 hours during the year, and consumed about 169 tons of coal.

278. Falkner Island, Connecticut.—The 10-inch steam whistle, in duplicate, was in operation some 404 hours during the year, and consumed about 38 tons of coal.

279. Southwest Ledge, Connecticut.—The second-class Daboll trumpet, operated by oil engines in duplicate, was established March 30, 1897. No record of hours in operation or quantity of oil used was kept, the apparatus having remained imperfect.

282. Stratford Shoal (Middle Ground), New York.—The second-class Daboll trumpet, worked by caloric engines in duplicate, was in operation some 353 hours during the year, and consumed about 3 tons of coal.

289. Penfield Reef, Connecticut.—The Daboll trumpet, worked by Rider hot-air engines in duplicate, was in operation some 337 hours during the year, and consumed about 2 tons of coal.

291. Eatons Neck, New York.—The second-class steam siren, in duplicate, was in operation some 461 hours during the year, and consumed about 31 tons of coal.

297. Great Captain Island, New York.—The 10-inch steam whistle, in duplicate, was in operation some 393 hours during the year, and consumed about 50 tons of coal.

301. Execution Rocks, New York.—The first-class automatic steam siren, in duplicate, was in operation some 307 hours during the year, and consumed about 47 tons of coal.

Third District.

316. Fire Island light-vessel, No. 58, New York.—The 12-inch steam chime whistle was in operation some 654 hours, and consumed about 124 tons of coal.

318. Sandy Hook light-vessel, No. 51, New York.—The 12-inch steam whistle was in operation some 640 hours during the year, and consumed about 111 tons of coal.

333. North Hook beacon, Sandy Hook, New Jersey.—The first-class automatic steam siren, in duplicate, was in operation some 846 hours during the year, and consumed about 63 tons of coal.

341. Old Orchard Shoal, New York.—The blower siren, worked by an oil engine, established August 20, 1896, was in operation some 507 hours during the year, and consumed about 299 gallons of oil.

353. Robbins Reef, New York Harbor.—The blower siren, worked by an oil engine, was in operation some 299 hours during the year, and consumed about 142 gallons of oil.

BUOYAGE.

In the past winter the temperature was so moderate that the iron buoys were not taken up until the end of January, and even then the buoys marking the turning points and other special positions in the principal channels of New York Lower Bay were still kept in place. The floating ice was neither as frequent nor as heavy as in some previous years, and the loss of buoys and appendages was comparatively light. Those lost were 1 whistling buoy, 2 bell buoys, 2 first-class ice buoys, 1 first-class nun buoy, 25 first-class spar buoys, 43 second-class spar buoys, 15 third-class spar buoys. There were also lost 2 first-class ballast balls, 7 first-class iron sinkers, 2 second-class iron sinkers, 13 first-class stone sinkers, 17 second-class stone sinkers, 2 third-class stone sinkers, 150 fathoms first-class chain, 50 fathoms second-class chain, 46 shackles, 3 swivels. The value of these buoys and appendages was $4,260. A few buoys which had drifted ashore were recovered by the tenders which look after the buoys that are carried away from their moorings. Five second-class nun buoys, painted white, were placed March 23, 1897, to mark the trial course of the U. S. ships Wilmington and Helena, and were taken up and discontinued on May 15, 1897.

ELECTRIC BUOYS.

The system of marking the Gedney, Bayside Range Cut, and Chapel Hill Range Cut channels, New York Lower Bay, with buoys lighted by electricity through submarine cables leading from Sandy Hook, is in successful operation and continues to give satisfaction. The six old or direct-current system of electric buoys, lighted by iron-armored, triple-conductor cables, to mark the Gedney Channel, were permanently discontinued and the buoys taken up November 11, 1896. The electric buoy, No. 12, at Southwest Spit, has a circuit of its own—part of the old system—which will be retained during the lifetime of the present cable. (An extension of this cable will light the Chapel Hill Range Cut Channel; electric buoy placed June 14, 1897.) The use of switches in the heads of buoys, applied, tentatively, in the early part of the present year, with a view to isolate defects in particular buoys, has not succeeded to the extent desired, due to inability, so far, to make them perfectly water-tight. They will be discontinued for the present and until the defect is overcome by improvement or change. The principal causes of failure in submarine cables for the operation of electric lights are now reduced to two, namely, the action of ice moving in heavy fields, which submerges the buoys, and the collision or fouling of passing vessels, which, by breaking the connection, extinguishes the the lights. The collision of vessels, however, as a disturbing element, is growing less frequent, owing to a better knowledge on the part of mariners enlightened by notices and requests published by the Light-House Establishment of the location of the cables and of the risks to themselves involved in fouling them. The adoption, last year, of a terminal "fork" or divergent ends running to the two lines of buoys instead of the loop which had previously fed them had the effect, several times, of preventing the lights on both sides of Gedney Channel from being out at the same time. The failures incidental to a system of buoys lighted with electric lamps, such as grounds, imperfect splicing, and defects inherent in the buoys, lamps, transformers, and cables, were reduced to a minimum by skill in the inspection and superintendence, the constant service of the tenders, and the watchfulness and care ot the keepers in charge of the plant at the station on Sandy Hook. The advantages of the new system of electric buoyage over the old are established and made manifest in the economy of cost and maintenance, and in the facilities for handling, repairing, and installing afforded by the materials employed.

The weather during the past winter was very cold in short spells, with long intervals of moderate temperature between them. The action of floating ice was not, therefore, as constant or detrimental as it was in several previous years. In consequence the lights of the electric buoys, although frequently extinguished for a short period at a time, were more effective than usual throughout the year. The history of the system and of the individual buoys is given as furnishing items of interest and perhaps suggestions of use. There were many times during the year when slight "grounds" caused the lights to burn low. On two days in January, 1897, the whole system was extinguished for a few hours each day, due to submergence of the buoys by ice. In February all the lights were out for six nights. In April they were out two nights, and in May four. Seventeen new buoys in all were put down, nine to replace those burned out at the heads, or otherwise damaged by electrical action, and eight in place of buoys destroyed by collisions of passing vessels. The history of the individual buoys or stations is as follows:

E 1.—Out one night, buoy struck by vessel; one night, lamp smashed by vessel; one night, carbon burned out, and five nights, damaged by ice. A short circuit, caused by the core of the cable chafing against a nail, extinguished the whole system. A new buoy was supplied.

E 2.—Out one night and part of another, due to a broken carbon, and for four hours, when a vessel had smashed the lamp. Caused entire extinction by having head of buoy burned off and transformer and switch burned out. The station received three new buoys.

E 3.—Out one night, lamp smashed by vessel; three nights, lamp and transformer smashed. Caused total extinction twice; by damage from ice on one occasion, and a defective transformer on the other. A new buoy was furnished.

E 4.—Out two nights, due to defective lamp, and five nights, damaged by ice. Caused extinction of lights on one side of the channel. Two new buoys and a new transformer furnished.

E 5.—The head of the buoy burned off and the lamp and transformer caused suspension of all the lights on one side. Two new buoys were supplied.

E 6.—Out two nights, lamp smashed by vessel. A short circuit at this buoy caused a total extinction. Two new buoys furnished.

E 7.—Caused three "grounds" by defects in head of buoy and core of transformer, and in having the cable fouled and the buoy cut off by a passing vessel. Three new buoys furnished.

E 8.—Out five nights, damaged by ice, and parts of two nights, lamp damaged by vessel and carbon burned out. Caused total extinction twice owing to defects of insulation near the buoy and extinction of lights on one side twice, due to a defective transformer and damage by ice. One new buoy furnished.

B 2.—Out one night, defective lamp, and one night, lamp smashed by collision. Caused total suspension twice and partial suspension twice. At one time the buoy was cut off below the water line by a steamer, at another by a sailing vessel, and on the two other occasions suspension was due to electrical defects.

No. 12.—Out four nights, due once to a vessel smashing the lamp, and due three times to broken carbons and an unserviceable lamp.

During the year the cable of the Southwest Spit buoy was damaged once, February 6, 1897, by a vessel fouling it. Repairs were promptly made and the light restored. On November 11, 1896, 1,700 feet of new copper-armored cable was laid across the inner or westerly end of Gedney Channel and the old cable was taken up. A composition junction box was put in place of the iron one in previous use. On November 17, 100 feet of new copper-armored cable was spliced in between buoys E 5 and E 7. A new coal house was built. A new boiler room was added to the station, and a new 40-horse powerboiler was put in. The consumption of coal during the year was 334½ tons. The plant throughout is in excellent order, and the keepers perform their duties well. About 10,560 feet of new cable is on hand to make repairs, and it is estimated that a similar quantity purchased at an early day will meet all the requirements for cable in the coming year.

Third District.

The number of vessels using Gedney Channel for the fiscal year 1896–97, and since the date of establishing the electric buoys, is shown by the following tables:

Number of vessels using Gedney Channel, New York Lower Bay, between sunset and sunrise, in the fiscal year 1896–97.

Fiscal year and month.	Bound in.	Bound out.	Total.
1896.			
July	27	15	42
August	42	13	55
September	34	10	44
October	51	10	61
November	57	6	63
December	70	29	99
1897.			
January	60	28	88
February	29	26	55
March	38	20	58
April	44	19	63
May	49	31	80
June	40	15	55
Total	541	222	763
Average per month	45.1	18.5	63.6

Synopsis showing the number of vessels using Gedney Channel at night, since the installation of the electric-buoy plant November 7, 1888.

	Number of vessels.			Average per month.		
	Bound in.	Bound out.	Total.	Bound in.	Bound out.	Total.
1888–89 (seven months)	171	53	224	24.4	7.6	32
1889–90	377	192	569	31.4	16	47.4
1890–91	470	297	767	39.1	24.7	63.9
1891–92	533	252	785	44.4	21	65.4
1892–93 (ten months only)	487	215	702	48.7	21.5	70.2
1893–94	648	347	995	54	28.9	82.9
1894–95 (eleven months only)	561	286	847	51	26	77
1895–96	542	238	780	45.1	19.9	65
1896–97	541	222	763	45.1	18.5	63.6

An interesting item furnished by this schedule is the fact that the traffic in and out increased up to 1894, and has since declined.

DEPOTS.

Tompkinsville, Staten Island, New York Harbor.—This is the general depot for the Light-House Establishment, as well as the principal depot of the Third district. The greater part of the oil-cleansing materials, tools, and implements, and other articles of general supply throughout the year, are purchased under contract and stored at this depot for distribution by the supply steamer along the coast from Maine to Texas, and by the tenders of the district to the stations within its limits, and for shipment to the different districts, after competitive bids by the various lines of transportation radiating from the vicinity of New York

City. Here are the shops for the manufacture and repair of illuminating and sound-signal apparatus, oil cans, boxes, and boats, and the buildings for storing and keeping them when they are ready for service. Here, also, are the laboratory and buildings for experimental work on lenses, lamps, fog signals, and other aids to navigation, and for testing the oils, chimneys, and general supplies received for stock. The vessels of the district and the supply steamer are repaired, whenever practicable, by mechanics employed at the depot, and painting, sailmaking, and policing the grounds are done by the men employed to receive and ship supplies. The fire department is composed of the mechanics and laborers of the yard and of the crews of vessels lying at the docks. It is thoroughly organized and effective for service day or night. The power house and electric plant, enlarged and improved during the past year, continue to be efficient in lighting the depot and heating the shops and stores by steam.

The work carried on in the inspector's department embraced the handling, storing, and shipping of supplies, rations, buoys and appendages, chain, anchors, ship chandlery, and fuel; loading and unloading the supply vessel and tenders; testing oils, chimneys, and stores of different kinds; overhauling and repairing tenders and light-ships as far as practicable with the local force; making and repairing boats, sails, awnings, etc., repairing iron buoys, and much service in construction and repair by the carpenter, blacksmith, boat builder, and lamp shops of the depot.

In 1863, when the storehouse was built, and up to 1869, when the lamp shop and the office building were put up, the depot was ample for the manufacture, storage, and handling of the supplies required; but now the buildings are inadequate and unsafe, while the area of the grounds is insufficient for the storage and handling of buoys and appendages and other heavy and unwieldy articles.

The oil house will hold, at most, 25,000 5-gallon cases, while room for 75,000 cases is required. A shop is needed for repairing leaky oil cans, of which as many as 10,000 are on hand at a time. To find space for oil received under contract, the coal shed and other outlying sheds have to be utilized, and frequently there are from 300 to 400 barrels of oil kept on the wharves. This results in much loss from exposure to the weather.

The Board submits to practical experiment any apparatus or material brought to its notice which is likely to be an improvement on previous means or methods. Tests of this kind are conducted as long and as often as the accommodations will permit. A readjustment of the different structures is urgently needed to make these tests effectively and economically.

The old storehouse was repaired and improved in such way as to enlarge to the utmost its facilities for the receipt and delivery of supplies.

Third District.

New steam engines and boilers, new dynamos and connections, and new steam pipe and fittings were put into the power house. The roof was repaired and new smoke pipes were placed.

The building at the depot occupied by the Revenue-Cutter Service as a storehouse for condemned material was restored in September, 1896, to its original purpose of holding light-house supplies. But a space smaller in area, yet quite as much needed, had to be assigned in the storehouse proper for the use of the Revenue-Cutter Service.

The following is a statement of the principal work done at this depot during the year under the direction of the light-house engineer:

A temporary breakwater was completed July 29, 1896, 50 feet long, extending partially across the basin entrance, to reduce its width, and to lessen the danger and disturbance in the basin during easterly gales. A bulkhead wall and apron was completed December 12, 1896. It was connected with the unfinished end of the old bulkhead wall and apron to the Cotton Dock wharves, a distance of about 330 feet. A concrete retaining wall was completed April 23, 1897. This connected with and extended from the south end of the bulkhead wall westward about 100 feet to the depot shore line. Sheet piling, creosoted, was driven along the entire length of the south side of the south wharf and was completed September 12, 1896. This was done to prevent the filling up of the basin by drifting silt. The removal of the old south wharf and the clearing and dredging of its site 14 feet was completed July 22, 1896. On August 14, 1896, the work of dredging the area of the basin proper to a depth of 14 feet and the removal of about 15,730 cubic yards of dredged material was completed. The roadways and the grounds were put in order. New flagstone sidewalks were laid and the old ones were repaired. The north gate, main entrance, was enlarged, and the roadway macadamized. The sewer system was completed. The experimental iron tower and power house were removed.

The efficiency of the steam and electric plant was increased by the addition of two dynamos, two engines, and two boilers, but the proposed work is not yet completed.

The work of earth filling the area behind the bulkhead wall under contract was begun, and up to the end of June 1380 cubic yards of earth had been placed. The engineer's quarters were renovated. A 72-tube radiator was set up in the carpenter shop and connected with the boiler house.

In addition to the foregoing, the general work of the depot, which consisted in part of the following, has been carried on:

The receipt, preparation, care, and shipment of material and stores for the general work of this and the various light-house districts; the repairs and alterations of the steamers, fog signals, light-vessels, and stations, the maintenance of the quarters, shops, buildings, fences, and grounds of the depot; the examination and test of illuminating and other apparatus from abroad, the preparation of new and the repair of old illuminating apparatus, supplies, and fog signals for the various districts, the manufacture and repair of oil supply cans and boxes; the setting up and testing of improved fog-signal and other apparatus, and experiments in connection therewith, and the preparation of plans, drawings, and estimates for works.

By the act approved June 4, 1897, $25,000 was appropriated for continuing the construction of the sea wall, constructing oil house, rebuilding storehouse and wharves, and dredging the basin at the General Light-House Depot at Tompkinsville, Staten Island, N. Y.

The following recommendation, made in the Board's last annual report, is renewed:

> The approaching completion of this part of the work of adapting the general depot to the growing requirements of the service makes more conspicuous the present inadequate and unsafe accommodations for the supply and manufacturing departments, and for the office force.
>
> The buildings now used for these purposes are in many cases cheap wooden structures erected at various times from urgent necessity, and the present condition of the establishment is largely the result of irregular and spasmodic growth with no systematic arrangement. The ground area, which is limited at best, has been still further restricted by these one-story structures, which, besides having very limited storage room for the ground space they occupy, are a standing menace to the whole depot on account of their inflammable character. Even the building used for storing the mineral oil, of which as much as 165,000 gallons has been in store at one time, is a one-story wooden building. The business of manufacturing and testing illuminating and fog-signal apparatus and materials and of oil cans and boxes has far outgrown the accommodations afforded by the buildings in which these operations are conducted. The removal of all structures built of inflammable material and the erection in their stead of two fireproof buildings for storage and manufacturing purposes are urgent needs of this depot. The new buildings should be designed to give ample capacity, and at the same time afford a large clear area in the yard for storage and handling of buoys and other bulky and heavy articles. An enlargement of the present office building is also urgently required.
>
> It is estimated that $25,000 can be properly expended during the coming fiscal year in continuing the improvements to the grounds and buildings, the construction of the sea wall, the rebuilding of the wharves, and the dredging of the basin at the General Light-House Depot, and it is recommended that an appropriation of this amount be made therefor.

The following tabular statements show in a condensed form the shipments and receipts at the depot during the year and the articles manufactured:

Statement of boxes, barrels, packages, etc., containing supplies received at and shipped from the General Light-House Depot, Staten Island (Inspector's department), during the fiscal year ending June 30, 1897.

	Boxes.	Barrels and kegs.	Packages and coils.	Cans.	Total.
Received	12,094	8,463	5,670	50,376	76,603
Shipped	10,270	7,027	8,706	65,412	91,415
Total	22,364	15,490	14,376	115,788	168,018

Third District.

Statement of buoys, buoy appendages, and chain received at and shipped from the General Light-House Depot (Inspector's department) during the fiscal year ending June 30, 1897.

Articles.	Received.	Shipped.	Total.
Whistling buoys	20	11	31
Bell buoys	22	10	32
Can buoys	61	45	106
Nun buoys	82	38	120
Ice buoys	17	21	38
Spar, wood	357	99	456
Ballast balls	94	80	174
Sinkers, iron and stone	280	172	452
Shackles and swivels	1,852	2,133	3,985
Chain, buoy, fathoms	6,522	4,030	10,552
Chain, light vessel, fathoms	330	894	1,224
Mushroom anchors	7	10	17
Fluke anchors	0	0	0

Statement of quantity of lard and mineral oils received at and delivered from the General Light-House Depot, Staten Island (Inspector's department), during the fiscal year ending June 30, 1897.

	Received.	Delivered.	Total.
	Gallons.	*Gallons.*	*Gallons.*
Mineral oil	470,553¼	364,365	834,918¼
Lard oil	4,079¾	4,645¾	8,725½
Total	474,633	369,010¾	843,643¾

List of lens apparatus, etc., received at and shipped from General Light-House Depot, Staten Island, New York, by Engineer Third light house district, with number of cases in which received and shipped, during the year ending June 30, 1897.

	First order.	Second order.	Third order.	Three and a half order.	Fourth order.	Fifth order.	Light-ship lanterns.	Lens and assorted lanterns.	Optical parts of lenses.	Total.
Lens apparatus:										
Received	0	0	0	0	21	4	0	0	88	113
Delivered	0	0	1	0	6	1	1	18	0	27
Total	0	0	1	0	27	5	1	18	88	140
Cases:										
Received	0	0	0	0	35	4	0	0	16	55
Delivered	0	0	22	0	27	6	8	20	0	83
Total	0	0	22	0	62	10	8	20	16	138

List of miscellaneous packages, etc., exclusive of lens apparatus, received at and delivered from General Light-House Depot by Engineer Third light-house district, from July 1, 1896, to June 30, 1897.

	Boxes.	Barrels.	Bales, bundles, coils, packages, etc.	Kegs.	Cans.	Total.
Received	684	1,412	5,462	82	7	7,647
Delivered	568	792	1,896	51	22	3,329
Total	1,252	2,204	7,358	133	29	10,976

Gardenia nor the tender *John Rodgers* is capable of taking the sea in rough weather outside of Sandy Hook. The *Gardenia* is a small wooden propeller of but 82 tons burden; she is 18 years old, and was purchased second hand in 1887. The *John Rodgers* is an iron sidewheel vessel of 260 tons, which was built in 1883, and has been kept hard at work ever since. Both vessels are too old, too small, and too weak for the new duty devolved on the tenders by the establishment of a light-vessel station 35 miles east of Sandy Hook. The necessities of electric-light vessel, No. 51, at Sandy Hook, added to the routine of other work, exact such frequent movement on the part of the tenders that this additional service should be temporary, until a new vessel take her place. The new vessel should be a composite screw steamer, of the latest design, swift and powerful, for service at sea, and fitted and equipped to carry every portable aid to navigation, and to meet every demand of a service that will continue to expand. It is estimated that such a steamer could be built, fitted out, and made ready for service, for, say, $95,000, and it is recommended that an appropriation of this amount be made therefor.

The Rose.—This little screw steamer received extensive repairs and alterations during the year which may be summarized thus: The boiler was reriveted throughout with wrought-iron rivets, braced, stayed, patched, etc.; the engine, deck house, hull, gratings, rail, towing bitts, awnings, etc., were repaired. A new derrick and boom, new awnings and railing around the top of the deck house and a new water tank and knees were furnished and fitted, and stern bolts in the planking were refastened. With the exception of the time occupied in the foregoing work and minor repairs, etc., a total of about four months in all, this vessel was almost constantly employed in the general work of the district pertaining to inspection, construction, repairs, fog signals, etc. During this time she ran about 4,965 miles, with a consumption of some 243 tons of coal.

Steam launch Nettle.—During the year the hull of this vessel, from keel to sponsons, was sheathed with 1½-inch yellow pine planking, and 2 new bilge keelsons were furnished and fitted, her boiler was patched, and 51 new tubes were fitted, the engines were overhauled, repairs were made to the deck house, hull, gratings, rail, and awnings, the pilot house was enlarged and railing fitted, and the vessel scraped and painted throughout. She is occasionally used in the transportation of workmen and material for repairs to stations in New York Bay and Harbor, in the receipt and shipment of stores and freight, and is particularly useful in the work of inspection and repairs in the Whitehall Narrows and Lake Champlain. During the year she steamed about 1,425 miles with a consumption of some 19 tons of coal.

Float for gas tanks.—This vessel is kept for conveying gas tanks to and from the Romer Shoal Beacon in New York Lower Bay. She has been repaired, and is now in good order.

FOURTH DISTRICT.

This district extends from a point on the coast of New Jersey opposite Shrewsbury Rocks (but does not include the rocks) to and including Metomkin Inlet, Virginia. It embraces all aids to navigation on the seacoast of New Jersey, Delaware, Maryland, and Virginia, and the tidal waters tributary to the sea between the rocks and the inlet.

Inspector.—Commander C. J. Train, United States Navy.

Engineer.—Maj. William H. Bixby, Corps of Engineers, United States Army.

In this district there are—

Light-houses and beacon lights, including 7 post lights	63
Light-vessels in position	4
Day or unlighted beacons	5
Fog signals operated by steam or hot-air engines	6
Fog signals operated by clockwork	7
Gas-lighted buoys in position	2
Whistling buoys in position	4
Bell buoys in position	6
Ice buoys in position	36
Other buoys in position	164
Steamer *Zizania*, buoy tender, and for supply and inspection	1
Naphtha launch *Leal*, used for works of construction and repair	1

LIGHT-STATION.

415. Sea Girt, near Squan Inlet, seacoast of New Jersey.—The light-house, with oil house, well, and windmill, was completed early in the year, and its light was exhibited for the first time on the night of December 10, 1896. The surfacing of the lot was partially completed.

416. Barnegat, seacoast of New Jersey.—This station was put in thorough repair.

417. Tucker Beach, seacoast of New Jersey.—The surface of the light-house site was in part graded up from 1 to 3 feet to a level which it is thought will protect it from further overflow by high tides, and the road to the boathouse and buoy shed, 1,440 feet long, was turnpiked and given a shell surface. Minor repairs were made.

418. Absecon, Atlantic City, seacoast of New Jersey.—The tower was repainted, and various repairs were made. The soiling and grassing of the grounds, formerly loose, drifting sand, was completed. Preparations were made for changing the colors of the tower from white and red to orange and black.

419. Ludlam Beach, Sea Isle City, seacoast of New Jersey.—The dwelling was put in order. The front sea bulkhead was strengthened, and the grounds were regraded where washed by surf from ocean storms. This station may have to be moved back away from the surf within a few years.

420. Hereford Inlet, seacoast of New Jersey.—The dwelling was overhauled. The site, largely of loose, blowing sand, was partially regraded and refenced. A detached brick oil house was erected. Preparations were made to change the light from fixed white to flashing red and white.

423. Cape May, seacoast of New Jersey.—The tower was repainted, and minor repairs were made. The dwellings were extensively repaired. The following recommendation made in the Board's last annual report is renewed:

> This is a first-order seacoast light, and three keepers are employed to attend it. There are quarters for only two families, and the third keeper has to be accommodated by makeshift arrangements which are thoroughly unsatisfactory and detrimental to the discipline and efficiency of the service. It is estimated that an additional keeper's dwelling can be built here at a cost not exceeding $4,000, and it is recommended that an appropriation of that amount be made therefor.

424. Cape Henlopen, entrance to Delaware Bay, Delaware.—The water tank, etc., covered by drifting sand, were dug out and moved. A rough detached oil shed was built for use until a fireproof building can be provided. The high sand dune surrounding this station is steadily blowing away. Extensive repairs were made.

425. Delaware Breakwater, east end, Delaware.—The oil was moved into a rough detached shed to wait until a fireproof structure can be provided. A Hornsby-Akroyd oil engine of 5-brake horsepower was put in the fog-signal house. Extensive repairs were made.

426. Delaware Breakwater, front, Delaware Bay, Delaware.—The oil was moved into a rough detached shed to wait until a fireproof structure can be provided. Various repairs were made.

427. Delaware Breakwater, rear, Delaware Bay, Delaware.—The oil was moved into a rough detached shed to wait until a fireproof structure can be provided.

428. Delaware Breakwater, west end, Beacon, Delaware Bay, Delaware.—A rough shelter was built around the post of this beacon for the service of the light, and its boat landing was rebuilt.

429. Mispillion Creek, Delaware Bay, Delaware.—The high dike around the site, the stone riprap on its bay front, and the new water tank were completed. Extensive repairs were made.

430. Brandywine Shoal, Delaware Bay, Delaware.—All ironwork was scaled from rust and repainted. Heavy stone riprap ice breakers were begun under contract on both the up and down stream sides of the platform, 3,000 tons at each place. Preparations were made to repair the broken and seriously rusted iron bracing of the light and platform. Extensive repairs were made.

Fourth District.

431. *Fourteen-Foot Bank, Delaware Bay, Delaware.*—The water tanks were overhauled, and preparations were made for a better water supply both for drinking and against fire. Various repairs were made.

433. *Murderkill Creek, rear beacon, Delaware Bay, Delaware.*—This light was permanently lowered 20 feet, and a square day mark was added at the top of the old mast at the height of the old light to show the range more distinctly.

434. *St. Jones Creek, front beacon, Delaware Bay, Delaware.*—This light was raised 4 feet to place it above the low night mist.

435. *St. Jones Creek, rear beacon, Delaware Bay, Delaware.*—This light was raised 13 feet to show the range more distinctly. Later, being undermined by the bay storms, it was reerected about 20 feet in rear of its former position on the same range as before.

436. *Maurice River, New Jersey.*—The boat entrance was completed, the dike front was revetted, and the drains were cleaned out.

437, 438. *Maurice River range lights, Delaware Bay, New Jersey.*—A preliminary survey of the channel was made in October, 1896. A light-house site was surveyed in April, 1897, and negotiations for its purchase were begun. Progress with this work is much delayed by the difficulties met in acquiring possession of the land.

439. *Egg Island, Delaware Bay, New Jersey.*—The oil was moved into a rough detached shed to wait until a fireproof structure can be provided. A well was partly sunk, to be completed as soon as practicable to supplement the roof water for house use.

442. *Mahon River, Delaware Bay, Delaware.*—The barn was raised about 4 feet to place it above storm tides. The road approach was raised somewhat and shelled. The oil was moved into a rough detached shed to wait until a fireproof structure can be provided. Minor repairs were made. A preliminary survey was made, and steps are being taken toward the acquisition of a sufficient light-house site. While the shore at the old station is still wearing, the rate is so slow that the present structure will last for a few more years.

444. *Cohansey, New Jersey.*—The oil was moved into a rough, detached shed, which is to be used until a fireproof structure can be provided. The elevated foot walks were repaired. The area under the house was raised about a foot to keep it dry, and the drains and sluices were put in order. The boat dock was deepened about 2½ feet, and its pile bulkhead was riprapped on its two most exposed sides.

446. *Port Penn Range (front), below Port Penn, Delaware River, Delaware.*—The attached kitchen was raised, releveled, and its foundation strengthened. The grounds around the house and barn were graded up to above storm-tide overflow, and the outbuildings were arranged in accordance. The oil was moved into a rough, detached shed, which is to be used until a fireproof structure can be provided.

Fourth District.

447. Port Penn Range (rear), Delaware River, Delaware.—The dwelling was thoroughly overhauled. A kitchen and porch were added, a well, furnishing a full supply of good water, was sunk, house drains were dug, 180 feet of brick walks were laid, 350 feet of wire fence were erected around the house lot, barn entrances were provided, and road culverts were repaired. A detatched brick oil house was erected.

448. Reedy Island (front), Delaware River, Delaware.—The dike on the west and south sides, where cut down by storm tides, was strengthened by about 300 yards of stone riprap. The light was changed on July 26, 1896, to a twinkling light similar to the other front range lights of this river, and the red cut was moved to cover the island jetty. Extensive repairs were made.

449. Reedy Island (rear), Delaware River, Delaware.—An open brick-lined well was sunk, the light-house site inclosed with a substantial wire fence, brick walks were laid, and the grounds were graded.

450. Salem Creek, Delaware Bay, New Jersey.—The erection of this structure was completed September 30, 1896, and the light was exhibited for the first time on the night of November 17, 1896. In December, 63 piles, in 9 clusters, were driven outside and around the structure to serve as a protection against ice. During the winter two of these clusters were broken off, one of the cast-iron piles of the lantern platform was broken, and the whole structure was just saved from total wreckage by the other piling.

451. Finns Point Range (front), Delaware River, New Jersey.—The day mark, now useless, was removed from the roof. The dwelling was thoroughly repaired. A kitchen addition was built. Water tanks were added at both house and barns. Brick walks were added around the house. The oil was moved into a rough, detached shed, to wait until a fireproof structure can be built. The south end of the lot was fenced.

452. Finns Point Range (rear), Delaware River, New Jersey.—The high tower was put in order. The dwelling was thoroughly repaired. Pumps and hose were added against fire. The rear of the light-house site was fenced.

454. Newcastle Range (front), Delaware River, Delaware.—The tower and dwelling were put in thorough repair. The well was provided with a shelter. New fencing, 190 feet, was added on the southeast side, and jetties, about 90 feet, torn down by storms, were rebuilt.

455. Newcastle Range (rear), Delaware River, Delaware.—The dwelling, including its small tower, was thoroughly repaired. A detached brick oil house was built.

456. Deep Water Point Range (front), Delaware River, New Jersey.—The dwelling, including its small tower, was thoroughly repaired. A kitchen addition was built. The old shed was utilized as a temporary barn. A tank, and a drive well, force pump, and hose were added.

Brick walks were relaid and extended. A temporary right of way to the main road was secured until a permanent right of way can be obtained.

458. Christiana beacon, Delaware River, Delaware.—The post of this light, knocked over by passing vessels, was twice repaired.

459. Christiana, Delaware River, Delaware.—The dwelling was thoroughly repaired. The north end of the lot was fenced. Leaks in the river dike were repaired. Outbuildings, including the barn, were raised about 4 feet and the land-boundary dikes were raised and strengthened to allow of the complete filling in of the light-house site by dredges now under contract with the War Department for dredging the adjoining river. This filling in will prevent river overflow and the need of the reconstruction of the river dikes.

460. Cherry Island Range (front), Delaware River, Delaware.—The dwelling, fog signal, and detached tower were thoroughly repaired. A red cut was added to show upstream and keep vessels off of the west bank. A detached brick oil house was built.

461. Cherry Island Range (rear), Delaware River, Delaware.—The dwelling, including its small tower, was thoroughly repaired. A detached brick oil house was built.

462. Schooner Ledge Range (front), Delaware River, Pennsylvania.—The dwelling was sheathed and strengthened. The river dike was extended. An elevated foot walk, 478 feet long, was built to connect the station with the shore.

463. Schooner Ledge Range (rear), Delaware River, Pennsylvania.—The dwelling was thoroughly repaired. The oil was moved into a rough detached shed which will be used until a fireproof structure can be built. Foot walks were built above the flood level. The entrance road was raised and graded.

465. Tinicum Island (rear), Delaware River, New Jersey.—The high tower was provided with an inside hand rail, and its high day mark was renewed and raised 35 feet above the top of the tower to show above interfering trees. The dwelling was thoroughly repaired. Brick walks and outbuildings were repaired.

466. Fort Mifflin Bar Cut (rear), Delaware River, New Jersey.—The high tower was repaired. The dwelling was put in thorough order and was provided with pump and hose against fire. Brick walks were extended.

471-473. Horseshoe Range (east group), Delaware River, New Jersey.—The high tower was repaired. The dwelling was put in thorough order. The grounds around the dwelling and front beacons were graded and drained. The entrance road was surfaced. The sides and front of the site, 800 feet, were fenced in.

474, 475. Schuylkill (front and rear), Schuylkill River, Pennsylvania.—Both lights were, on June 30, 1897, moved to a new temporary range about 100 feet northward of the old range to mark a newly dredged channel over the river bar. The sea wall, 700 feet, in front of the dwelling was rebuilt. The road entrance was turnpiked across the rear marsh. Work was begun upon raising the dwelling about 5 feet and moving back the outbuildings about 800 feet to allow the grading up of this portion of the island by the Navy Department.

482. Fenwick Island, seacoast of Delaware.—Preparations were made for the thorough repair of this station.

485. Fishing Point beacon, seacoast of Virginia.—A post with elevated walk, etc., was erected on the end of the sand spit at the south end of Assateague Island. The light was exhibited for the first time on the night of November 18, 1896. This light was partly washed down by the sea once during the winter, but was immediately replaced. As the shoal to be marked by this light is constantly changing position, a fixed and permanent location for it is almost impracticable at this place.

Two hundred and twenty-seven inspections of light-vessels, stations, and post lights were made during the year, and at each, the stations were found in an efficient condition and the keepers generally attentive to their duties. Frequent inspections of the buoys were made.

REPAIRS.

At each of the following-named stations repairs of greater or less extent were made during the year:

440. Cross Ledge, N. J.
443. Ship John Shoal, Del.
445. Bombay Hook, Del.
457. Deep Water Point (rear), N. J.
464. Billingsport (front), N. J.
468–470. Horseshoe Range (west group), Pa.

FOG SIGNALS.

A Hornsby-Akroyd oil engine of 5-brake horsepower was put in at the Delaware Breakwater (east end) light-station. The overhauling of bell-striking machinery was completed at Brandywine Shoal, Cross Ledge, Ship John Shoal, and Reedy Island (front), Delaware Bay; at Cherry Island (front), Delaware River, Delaware; at Fort Mifflin Fog-Signal Station, Delaware River, Pennsylvania, and also at Killick Shoal, Chincoteague Bay, Virginia. This will render the apparatus fairly serviceable for several years more.

LIGHT-VESSELS.

421. Northeast End light-vessel, No. 44, off the seacoast of New Jersey.—This vessel was taken from her station on July 20, 1896, and docked, when her bottom was cleaned and painted with a coat of anticorrosive paint, followed by a coat of antifouling paint. A new smokestack was furnished and slight repairs were made to the boiler. About 150 feet of 2½-inch hose, 100 gunny bags, 26 tons of coal, 2 cords of wood, rations, deep-sea lead, buckets, drills, governors, tablecloths, 16 feet of 2½-inch suction hose with strainer, 8 rubbers and plates for surge reliever, and masts, sails, etc., for the boat were supplied. Two ensigns, 4 panes plate glass, and a pair binocular glasses were furnished.

422. *Five-Fathom Bank light-vessel, No. 40, off the seacoast of New Jersey.*—This vessel was removed from her station on June 5, 1897, and a whistling buoy painted red was placed at her moorings. New liners for steam chimneys, 2 new sets of tubes for boilers, and new tops to combustion chambers were supplied. The uptakes and gauge cocks were repaired, piping to the pump valves was renewed. Two new stop valves were furnished. Soft patches were put on the boiler. On June 29, 1897, the vessel was returned to her station and the whistling buoy was removed. Rations, 2 cords of wood, 42½ tons of coal, awning for the deck, covers for boats, rope, packing, reamers, coal bags, etc., were supplied. Six light-vessel lamp burners, 9 light-vessel lamps, 12 deflectors for lamps, and 1 log slate were furnished.

481. *Fenwick Island Shoal light-vessel, No. 52, off the seacoast of Maryland.*—This vessel was on July 13, 1896, taken to a dry dock, where her bottom was cleaned and painted with a coat of anticorrosive paint, followed by two coats of antifouling paint. Slight repairs were made to her fog-signal machinery and windlass. Fifteen fathoms of 2-inch chain and 2 connecting shackles were furnished. About 57 tons of coal, 3 cords of wood, locking pawls and head for the windlass, rations, brass glands, rope, dishes, etc., were supplied, and 1 boat was repaired. An ensign and a light-house pennant were furnished.

483. *Winter Quarter Shoal light-vessel, No. 45, off the seacoast of Virginia.*—This vessel parted her moorings on December 15, 1896, during a heavy gale from the north and was driven seaward. On December 30, when in latitude 37° 54′ north and longitude 90° 40′ west, she was picked up by the English steamer *Birdoswald*, bound to Hampton Roads, which towed her in. The light-house tender *Maple* towed her to her station, and on January 8, 1897, moored her in 14 fathoms of water. Rations, 2 cords of wood, 20 tons of coal, 1 glass cutter, sheet gum, medicine, bricks and grates for stoves, stove pipe, paints, etc., were supplied. One small boat was furnished. No repairs were made to the vessel.

Relief light-vessel for the Fourth light-house district.—The following recommendation was made in the Board's last three annual reports:

> During the recent cyclones light-ship No. 37, stationed off Five-Fathom Bank, coast of New Jersey, Atlantic Ocean, in the Fourth light-house district, was wrecked. There is now no relief light-ship in the Fourth light-house district. The interests of commerce and navigation urgently require that a new vessel should be provided to replace the wrecked vessel at the earliest day practicable. When that is done the vessel now on Five-Fathom Bank can be used as a relief light-vessel, and can be held in reserve to take the place of any one of the light-vessels now on stations in the Fourth light-house district whenever any of them may become disabled.

bulkhead was completed. The north sea wall was rebuilt. The sides and front of all these wharves need a renewal of their sheet piling, after which the basin should be again redredged.

The keepers of this depot are now obliged to live in Wilmington, about 4 miles distant. It is estimated that a suitable dwelling and necessary outbuildings can be built for not exceeding $5,000. Recommendation is therefore made that an appropriation of this amount be made therefor.

Chincoteague, Chincoteague Inlet, Virginia.—The spar buoys for Chincoteague and Metomkin Inlets are stored here. This place is also used as a depot for Assateague and Killick Shoal light-houses and for the care of boats from Winter Quarter Shoal light-vessel. The depot occupies half of a small wharf, and the frontage of the wharf is inadequate to properly accommodate the tender while lying there. The buoy house is not adapted to the care of the light-vessel's boats. A reasonable offer for additional wharf frontage was obtained from the owner of adjacent property, and deeds were secured and sent to the Attorney-General for examination.

TENDERS.

The Zizania.—This steel twin-screw steamer was employed throughout the year, except 52 days during which she was laid up for repairs, in attending to the buoyage of the district, in towing light-vessels to and from their stations, and in delivering fuel and supplies to light-houses, light-vessels, and post lights. She replaced and renewed 25 buoys, restored 2, lifted, repaired, and painted 16, placed 13, removed 12, changed 125, recovered 2, and made three trips to gas buoys. She delivered 107 tons of coal and 16½ cords of wood to light-stations, and 135½ tons of coal and 3 cords of wood to light-vessels. The crew was employed 28 days at Edgemoor light-house depot and the iron pier at Lewes, Del. She delivered the annual allowance of provisions to 4 light-vessels and 11 light-stations. She also conveyed the Inspector of the district to the light-stations of the district for the purpose of inspection, and she delivered the necessary supplies to the light-stations. In doing the above work she steamed about 11,485 miles and consumed some 830 tons of coal and 4 cords of wood.

A new plank shear was put on the hurricane deck, new awning stanchions of galvanized iron, new rail of 1½-inch galvanized pipe was put on. Two iron cleats for the main sheet were fitted, windows and doors of the pilot house were thoroughly overhauled and repaired, old sash weights were removed, and were replaced with new and improved sash lifters. The master's room aft of the pilot house was lengthened 4 feet at the after end. The hoisting engine was fitted so as to be worked forward and backward, a new shaft for falls was put in, rotten woodwork over the forward gangway doors was removed and replaced with new.

New boat davits were furnished. The coaming of the boiler hatch was repaired. The plank shear on the main deck in the inspector's cabin was repaired, and new stanchions between the main rail and the hurricane deck aft were fitted. New lead treads on the stairway, etc., were furnished and fitted. Two new water tanks of white pine, connected with the galley and engine room, were furnished and fitted. Bell wires were thoroughly overhauled. The distilling apparatus was removed from the galley, and in its place a locker was constructed and fitted with shelves, etc., and a new brass pump was supplied. An iron bilge box was made and located in the bilge near the bulkhead, and to which the manifold valves for the several compartments were transferred and connections made. The circulating pump was repaired. New brass rings were put in for thrust bearings. New brasses were fitted to the connecting rod for the air pump at outboard end. A sanitary pump was furnished and fitted to supply water to the several closets and bath tub. Stern bearings of both shafts were taken out and bushed anew with lignum-vitæ. One boat was repaired. The tender made two trips to Tompkinsville, N. Y., for the purpose of receiving supplies for the Fourth district, when she took part in the ceremonies for the dedication of the Grant tomb, on April 27, 1897.

Tender for Engineer Fourth district.—There is no vessel permanently available for the engineer service of construction and repair in this important district. Temporary arrangement has been made for the present working season by transferring the tug *Thistle* from the Fifth district, but this latter district has a large number of lights on inland waters, and a boat like the *Thistle* is essential for their proper maintenance. A suitable vessel for the permanent service of construction and repair is much needed in the Fourth district, which now has only one permanent tender attached.

FIFTH DISTRICT.

This district extends from, but does not include, Metomkin Inlet, Virginia, to and including New River Inlet, North Carolina. It embraces all aids to navigation on the seacoast of Virginia and North Carolina between the limits named, all of Chesapeake Bay, and the sounds of North Carolina and tributary waters.

Inspector.—Commander Benjamin P. Lamberton, United States Navy.

Engineer.—Maj. Ernest H. Ruffner, Corps of Engineers, United States Army.

In this district are—

Light-houses and beacon lights, including 6 post lights	126
Light-vessels in position	3
Day or unlighted beacons	10
Fog signals operated by steam or hot-air engines	3
Fog signal operated by petroleum engine	1
Fog signals operated by clockwork	65
Whistling buoy in position	1
Bell buoys in position	2
Gas-lighted buoy in position	1
Other buoys in position, including pile buoys and stakes	1, 150
Steamers *Maple* and *Violet*, buoy tenders, and for supply and inspection	2
Steam launch *Bramble*, used to supply gas to the beacons in the sounds of North Carolina	1
Sharpie (and gas tank) for supplying beacons and coast stations	1
Steamers *Jessamine* and *Thistle*, for construction and repairs	2

LIGHT-STATIONS.

487. Hog Island, Great Machipongo Inlet, seacoast of Virginia.—The temporary quarters, cistern, and stable were removed and the materials stored. Steps were made for the porches of the three dwellings, for the kitchens of the two assistant keepers' houses, and for the wood sheds. Mantels, dressers, closets, and shelving were put up, sash locks put on windows and hooks on blinds, and the washboarding was completed. Some painting was done.

490. Cape Henry, entrance to Chesapeake Bay, Virginia.—The dwellings for the keepers were put in complete order. Sheet piling and a brick wall were built around the oil house as a protection from sand drifts. A new summer kitchen and a new storehouse were built, and 556 running feet of new plank walk were laid, and a fusible plug was furnished for the fog-signal boiler.

5

Fifth District.

—. *Hog Island Wharf and Dollers Point, James River, Virginia.*—The following recommendations were made in the Board's annual report for the last five years:

> Lights have been maintained at these points for several years by private enterprise, and their value to the public interests of navigation is now evident. It is therefore recommended that proper measures be taken for establishing range lights at Dollers Point to guide vessels through the narrow and shallow channels, known as Goose Hill Slough, between Hog Island and Jamestown Island; also for the establishment of an inexpensive light on the wharf at Hog Island, to lead the way through another difficult channel from Deep Water Shoals light to the north point of Hog Island, where an abrupt turn is made to enter Goose Hill Slough.

It is estimated that these lights can be established for $2,500, and it is recommended that this amount be appropriated therefor.

505. *York Spit, entrance to York Spit, Virginia.*—The worn-out fog-bell machine was replaced.

506. *Old Plantation Flats, east side of Chesapeake Bay, Virginia.*—To increase the power of the light the fifth-order lens, some of the prisms of which were broken, was replaced by the fourth-order lens apparatus, brought from the old Hog Island light-station. The new lens was raised to the proper focal height by a new pedestal.

522. *Bowlers Rock, Rappahannock River, Virginia.*—About 200 additional tons of granite riprapping were placed on the masses already deposited about 100 feet above and below the light-house as a protection from ice fields.

—. *Beacon lights on Rappahannock River, Virginia.*—The following statement, in effect, was made in the Board's last four annual reports:

> The trade on this river is growing rapidly. At certain seasons of the year ten or more large steamers make weekly trips here, carrying vegetables, fruits, and the like. As the river is inadequately lighted, these steamers with their perishable freight often have to tie up at night for the lack of guiding lights. The Board recommends the establishment of a red light at the entrance to Carters Creek, at a cost not exceeding $3,000, and of three beacon lights, one on or near Sharp's wharf, below Suggett Point, one on Tappahannock wharf, and one on Taylor's wharf, at an estimated cost of $100 each. Recommendation is made that $3,300 be appropriated for this purpose.

530. *Smith Point, mouth of Potomac River, Virginia.*—The first bids received for the erection of this light-house were rejected. The second set were opened on July 30, and the lowest bid was accepted. A contract was made August 18, 1896, providing for the completion and delivery of the work within a year. The first shipment of materials for the wooden caisson was received at Baltimore on September 24 and 25, 1896, and its construction at one of the city docks was commenced. On November 17, 1896, it was successfully launched, and during March it was completed to towing trim with two sections of the cast-iron cylinder and the air shaft carried up to a height of 18 feet from the roof of the air chamber. No effort was made to hurry the work, as it

would have been hazardous to attempt to tow the caisson and superimposed cylinder plates down the bay before the arrival of settled weather.

On April 7, 1897, a start was made for the site, which was reached ten days later, after some time had been spent in harbor at the mouth of the Great Wicomico River awaiting favorable conditions. In addition to the 13 inches of concrete in the cylinder at starting, 3 feet had been deposited en route. The structure was grounded in its proper position on the afternoon of April 17, and about 150 tons of riprap stone were promptly placed around it to prevent scour. The cylinder, with the exception of the center compartment for the pneumatic apparatus, was then filled with concrete to the top of the bulkhead. Within a few hours after grounding the structure had settled about 2 feet and was deflected 4° from the perpendicular. On April 19, 200 tons more of stone were deposited around it. On April 21 the concrete filling reached the top of the second row of plates. Work was continued until April 25, when the fourth course of cylinder plates was in position and about half of the fifth course had been finished, and the concrete put in to within 6 inches of the top course of plates. It was then suspended until the air machinery, boiler, etc., could be gotten in readiness for commencing the sinking of the caisson. These preparations were completed on May 8, and the forcing of the structure into the shoal was rapidly carried forward until May 22, when it had reached the required depth, 15 feet 5 inches. In penetrating the last 3 feet of sand sulphuretted hydrogen gas was encountered, which seriously affected the eyes of the workmen and caused some delay. The pneumatic machinery was then removed, and the air shaft and the working chamber in the wooden caisson were filled with concrete. This work was completed on May 27, 1897, after which date nothing further was done until eight plates in the sixth course of the cylinder, which had been broken by the motion of the contractor's steamer moored alongside during the progress of the work, could be replaced by new ones. This required about twenty days. On June 16 the new plates were put in position and the construction of the cisterns was begun. The latter were completed on June 19, except the inside plastering. The rest of the concrete filling was then put in the cylinder, and the walls of the cellar were built up. The arches for the first floor of the superstructure were then erected, and on July 1, 1897, the substructure was practically completed. The work on the superstructure has been begun. The house, as far as completed, was found to be perfectly level, by ordinary tests.

Ragged Point, Potomac River, Virginia.—The following recommendation made in the Board's last annual report is renewed:

> This shoal makes off from the west bank of the river at a short turning point. It is important that this point be marked by a light at night and a fog signal during

thick weather. It is estimated that a light and fog-signal station can be established here for $20,000, and it is recommended that an appropriation of this amount be made therefor.

536. *Lower Cedar Point beacon, Potomac River, Maryland.*—A beacon light was established on the day beacon on the opposite side of the channel from the Lower Cedar Point light-house. A column was erected from a caisson holding the iron cage of the beacon braced by four iron rods connecting the top with the flange of the caisson. A wooden floor was laid on top of the cage and an iron plate was placed for the lantern to rest on. Iron ladders for attendance on the light were made and secured to the caisson and cage. The lantern was lighted on September 5, 1896. It shows a fixed white light.

537. *Lower Cedar Point, Potomac River, Maryland.*—At the date of the last annual report the materials for the rebuilding of this light-house, including the additional metal work required, had been procured, and the framing of the dwelling at the Lazaretto depot had been completed. The different parts of the work and the plant for its erection were loaded on scows at the depot early in July, 1896, and the tender *Jessamine*, with these in tow and a working party aboard, left Baltimore on July 10, arriving at the site two days later. The iron foundation of the old light-house had escaped uninjured from the fire which destroyed the superstructure in December, 1893, with the exception of two of the columns resting on the iron piles. The tension braces were unscrewed, these columns were removed and replaced by new ones, the braces were refastened, the perimeter and radial floor beams were set in place, the joists of the first story were laid, and the erection of the wooden frame of the superstructure was begun. This was soon finished and the lantern was set. The inside work, the construction of the main and lantern gallery, the setting in place of the lens, fog-bell apparatus, boat davits, and boat-hoisting apparatus, water tanks, smoke pipes, ladders, and lightning conductor were prosecuted rapidly, so that on August 20 the light-house was finished except the painting, which was completed on September 19 by two men left at the station for this purpose. The new light was exhibited on September 5, 1896. It was established with the same characteristics as the former light, but on October 10 the red sector was removed and the light is now a fixed white of the fourth order, illuminating the entire horizon. The superstructure is identical with that which was destroyed—a square, white, frame dwelling supporting a lantern—but some improvements were made in the interior arrangements. A fog bell operated by clockwork is struck a single blow at intervals of 12 seconds during thick or foggy weather.

539. *Upper Cedar Point, Potomac River, Maryland.*—On October 10 the red sector in the light showing between the bearings NE. ⅜ N. and NE. by E. ⅝ E. was discontinued. Various repairs were made.

Fifth District.

——. *Hooper Island Shoals, east side of Chesapeake Bay, between Tar Bay and Hooper Strait, Maryland.*—There is a stretch of about 30 miles between Cove Point and Smith Point which should be better lighted. For a part of the distance navigators are without a guide, where a deviation from the sailing course might carry vessels of heavy draft onto dangerous shoals. There are many of this class of craft trading to Baltimore, and their number is increasing. The shore on the west side of the bay hereabouts is bluff and can be more easily seen at night than that on the eastern side, which is low. The shoals to be dreaded lie along the latter, and a light placed near that vicinity would be a great aid to navigation. It is estimated that a proper light can be established here for not exceeding $60,000, and it is recommended that an appropriation of this amount be made therefor.

548. Cedar Point, mouth of Patuxent River, Chesapeake Bay, Maryland.—This station was completed by the contractor on September 20, 1896. The illuminating and fog bell apparatus were then installed, and everything was put in readiness for the exhibition of the light. The latter was shown on October 31 for the first time. It is of the fourth order, flashing red every five seconds. The fog bell is struck at intervals of thirty seconds during thick or foggy weather. The light-house consists of a keeper's dwelling, built of brick and wood in cottage style, from one corner of which rises a square tower of the same materials, supporting a lantern. The dwelling is three stories in height, including the basement, and the tower and lantern rise 50 feet above the ground. The focal plane of the light is 45 feet above mean high water. The fog bell and apparatus are placed in the upper room of a wooden structure 35 feet high and 12 feet by 16 feet in plan, the first story of which contains a summer kitchen, and the second floor two storerooms. There are also a brick oil house, a frame boathouse, and a small outhouse. Screens were provided for the doors and windows of the dwelling.

558. Baltimore Light and Fog-Signal Station, Patapsco River, Maryland.—The improvement of the Craighill Channel recently authorized involves a change of direction of the entrance to that channel, and this renders necessary a corresponding change in the location of the Baltimore light-house, which is intended to mark this entrance. It was thought that this shifting of the site might develop more favorable conditions for the foundation of a light structure, and examinations were accordingly made in December near the point selected as the new site. The test pile driven indicated that a safe foundation could be had at a considerably less distance below the surface of the shoal than was possible at the location first selected. Projects for a structure were prepared.

560. Craighill Channel (rear), Chesapeake Bay, Maryland.—This is a skeleton structure, 100 feet in height, built mainly of wood. The timbers at the base, resting on stone piers, were found, after twenty-three years' service, to be decayed. They were replaced, strengthened by iron rods and beams. The old storage platform was replaced by a new one, and a new ladder was provided. All new work was painted.

561. *Seven Foot Knoll, mouth of Patapsco River, Maryland.*—About 300 tons of riprap stone were deposited around the light-house to protect it from the attacks of moving ice masses.

565. *Hawkins Point, Patapsco River, Maryland.*—Trees and underbrush which obscured the range between this and the Leading Point light were cut down.

566. *Leading Point, Patapsco River, Maryland.*—An iron oil house was erected. Various repairs were made.

568. *Pooles Island, off mouth of Gunpowder River, Maryland.*—The coal house was remodeled to serve as an oil house. Various repairs were made.

569. *Turkey Point, head of Cheasapeake Bay, Maryland.*—The back building used as a kitchen was taken down and a new one with a porch and a pantry erected in its place. A new brick pavement was laid, two old brick pavements were relaid, and 240 feet of 3-inch plank walk was constructed. Various repairs were made.

570. *Fishing Battery, below entrance to Susquehanna River, Maryland.*—A new porch with platforms leading to the walks was built. Various repairs were made.

571. *Havre de Grace, mouth of Susquehanna River, Maryland.*—Brick pavements were laid in front and rear of the house, and two wooden walks were renewed. Various minor repairs were made.

575.—*Bodie Island, seacoast of North Carolina.*—Some 2,200 square feet of new wooden walks were put down, and 360 square feet of old wooden walks were relaid.

577. *Cape Hatteras Beacon, near the extremity of Cape Hatteras Point, North Carolina.*—During a severe storm this beacon was entirely submerged, and it became necessary to establish a lens lantern on a post erected in the vicinity but sufficiently remote from the shore line to be secure from destruction by the waves. This substitute answers the purposes of navigation as well as the former beacon.

579. *Ocracoke, entrance to Ocracoke Inlet, North Carolina.*—The dwelling, built in 1823, was a one-story structure with a gable roof, containing only three comfortable rooms. The upper or roof part has been entirely removed and a full story added to the structure, providing three good rooms. The old flooring was renewed and the structure was thoroughly repaired.

595. *Wade Point, Albemarle Sound, North Carolina.*—An additional landing ladder was set in place and a storage platform was constructed under the dwelling.

596. *Reeds Point beacon, mouth of Perquimans River, Albemarle Sound, North Carolina.*—This beacon was erected in January, 1896. A wooden pile 33 feet long was driven in 12 feet of water, cut off six inches below

water level, and capped and partly incased by an iron sleeve column bolted to it. An iron ladder was secured to the column and three iron thumbscrews were made for fastening the lantern to the top of the structure. Three wooden piles were driven around the beacon, forming an equilateral triangle in horizontal section; these piles were cut off three feet above water and bound together by cap logs. Additional fender piles were driven in groups of four at two corners of the triangle, a bunch of three at the other angle, and two on each side, all cut off six feet above the water and securely bolted together. The light was exhibited February 1, 1897. It is fixed white, shown from a pressed-glass lantern placed 16 feet above mean high water.

600. Roanoke River, near mouth of Roanoke River, North Carolina.—In January the galvanized-iron gutter on one side of the house was renewed and new balusters were put in the main gallery railing. A new boat-hoisting apparatus was provided and two of the boat davits were repaired. Minor repairs were made.

602. Roanoke Marshes, between Pamlico and Croatan Sounds, North Carolina.—In January, 1897, 80 large creosoted piles were driven in eight groups of 10 piles each—four groups north and four south of the light-house, at a distance from it of about 150 feet, the groups being 20 feet apart. The piles in each bunch were cut off 5 feet above the water and securely bound together by chains and staples. This provision was made for the protection of the light-house from blows by passing vessels and tows.

607. Northwest Point Royal Shoal, Pamlico Sound, North Carolina.—The contractors for the repair and strengthening of this structure, in the manner outlined in the last annual report, began work at the site in October, 1896, when they built a storehouse for materials, tools, etc., on a small island in the vicinity. The contract required that the work should be completed by December 27, 1896, but as practically nothing had been accomplished by this date an extension of time to June 30, 1897, was granted. Early in June, 1897, the contractors secured a suitable vessel, which left Norfolk for the site on June 13. By the end of the month three of the six supplementary piles were placed in position, the stones on the bottom having been removed for this purpose.

617. Johnson Point, Neuse River, North Carolina;

618. Lower Green Spring, Neuse River, North Carolina; and

619. Upper Green Spring, Neuse River, North Carolina.—These three beacon structures were erected in March. Each is composed of a center pile, surmounted by a wooden platform for supporting the light, with eyebolts for securing the lantern. Three fender piles joined together by timbers surround each beacon pile. The lights, all fixed white, 14 feet above the water level, were exhibited on April 15, 1897, for the first time.

Fifth District.

Iron ladders for light-stations.—A large number of the stations built on submerged sites are provided with one set of landing ladders only. It frequently happens, during visits of inspection by the district officers, that, owing to rough weather or other causes, it is difficult or impossible to make a landing on the side of the light-house supplied with ladders. To obviate this, each of these stations will be furnished with another set of ladders, so placed as to make landing feasible under all conditions. Arrangements have accordingly been made for the purchase of these ladders for 25 light-stations. They are now in course of construction under contract and will be placed as opportunity offers.

Working plant.—In July a new bottom was placed on the 16-foot rowboat, and slight repairs were made to the pile driver. In August one of the small flatboats was repaired. In October a merchandise truck and a pile-driver pulley were repaired. In November the yawl boat, the boiler frame on the pile-driver scow, the saw, mortising and drilling machines, and the blacksmith's forge were repaired, and one of the flatboats was calked. Extensive repairs to the woodwork, copper work, calking, steering gear, etc., of the large scow are now being made by contract.

REPAIRS.

Repairs more or less extensive were made at the following-named stations:

492. Old Point Comfort, Va.
500. Deep Water Shoals, Va.
520. Wolf Trap, Va.
523. Windmill Point, Va.
526. Janes Island, Md.
527. Somers Cove, Md.
535. Cobb Point Bar, Md.
538. Mathias Point Shoal, Md.
542. Jones Point, Va.
543. Holland Island Bar, Md.
546. Sharkfin Shoal, Md.
547. Hooper Strait, Md.
550. Cove Point, Md.
551. Sharps Island, Md.
553. Bloody Point Bar, Md.
557. Love Point, Md.
559. Craighill Channel (front), Md.
567. Lazaretto Point, Md.
576. Cape Hatteras, N. C.
580. Cape Lookout, N. C.
585–589. Gas-lighted beacons in North Landing River, Va., and Currituck Sound and North River, N. C.
597. Laurel Point, N. C.
598–599. Edenton Harbor Range, N. C.
605. Gull Shoal, N. C.

LIGHT-VESSELS.

488. *Cape Charles light-vessel, No. 49, entrance to Chesapeake Bay, Virginia.*—This vessel was on her station at the beginning of the year, and as she needed only some minor repairs, arrangements were made for having them done without taking her off the station. But on October 11, 1896, during a severe gale she parted her moorings and drifted off her station, although every effort was made by the crew to hold on. About 6 p. m. on that date, when about 16 miles to the southward and eastward of Cape Henry light, the cruiser *Raleigh* tried to get a line to

the light-vessel, but without success. The U. S. S. *Columbia* was more successful, and finally got a steel hawser aboard and towed the light-vessel into Hampton Roads, Virginia. Both anchors and 150 fathoms of chain were lost and some slight damage was done to the vessel. On October 12 she was taken to the buoy depot at Portsmouth, Va., a new smokestack was put in place, the boiler was overhauled, all damage done by the storm was repaired, and supplies for the winter were placed on board. On November 11 the vessel was towed back to her station by the light-house tender *Maple*, and she has remained there up to the present time. During the year she was furnished with fuel, two mushroom anchors, 150 fathoms of chain, window glass, paints and oil, oars, engineer's stores, fire bricks, fire clay, grate for the caboose, rope, and rations.

493. Bush Bluff light-vessel, entrance to Norfolk, Elizabeth River, Virginia.—The schooner *Drift* was on this station during the entire year. During the gale of October 11, 1896, she parted her moorings and drifted about 100 yards before she could be checked by the starboard anchor. On October 12 the light-house tender *Maple* supplied her with a new anchor and chain, and replaced her on her station. She was supplied with coal and wood, rope, oars, paint, coal hod, blocks, marlin spike, tar and tar oil, and rations.

529. Smith Point light vessel, No. 46, in Chesapeake Bay, off the mouth of the Potomac River, Virginia.—At the beginning of the fiscal year this vessel was under repair. After being put in good condition she was placed, July 16, 1896, on her station by the light-house tender *Maple*. Since then she has remained in position, and will be kept on this station until the light-house, now under construction, is completed. During the year she was supplied with fire buckets, coal hods, plate glass, flags, boat sails, medicine, coal, wood, and rations.

Steamer Holly.—This old light-house tender was not in service as a light-vessel during the year, but was kept in charge of a watchman at the buoy depot at Portsmouth, Va., in readiness for service in case she was needed on one of the less exposed stations.

—. *Cape Lookout Shoals light-vessel, North Carolina.*—The following recommendation was made in five preceding annual reports of the Board:

> Cape Lookout Shoals extend 8 miles beyond the point of the cape. There are dangerous breakers on the shoals 5 miles from the cape. When a vessel drawing more than 15 feet of water has made sufficient offing to just clear these shoals, she is 10 miles distant from the Cape Lookout light. Although this light is of the first order, shown from a tower 150 feet high, and should be seen a distance of 18 miles under favorable circumstances, it may happen during thick or hazy weather that a mariner may fail to see it in time to avoid that line of shoals. A light-ship of the improved model now constructed for use at exposed stations, and provided with a steam fog signal, to cost $80,000, approximately, would be a valuable aid to navigation if placed near the southern extremity of the shoals. It is therefore recommended that an appropriation of that amount be made therefor.

Fifth District.

578. *Diamond Shoals light-vessel, No. 69.*—The plans for this vessel, which were well advanced at the close of the last fiscal year, were finished, bids were called for, and contract was awarded to the lowest bidder. The vessel is to be completed in September, 1897. She will be placed on her station as soon as practicable. She has a steel frame, steel keel plate, steel bilge strake and steel sheer strake, connected by diagonal plates from keel to sheer strake, and is wood planked from the keel up to the sheer line at the main deck, and from that point up to the spar deck is plated with steel plate. She is 112 feet long, 28½ feet broad, and 22 feet 1½ inches deep, and is capable of moving with her own steam power. Her main engine is of the vertical, inverted surface-condensing type, with a single cylinder of 22 inches diameter, and with 22 inches of piston stroke, and has 350 indicated horsepower. Her screw propeller is about 8 feet in diameter and has 4 blades, with pitch and area for an estimated speed of 8 knots. Her main boiler is cylindrical and single ended, 12 feet 2 inches in diameter and 11 feet 3 inches long. She also has donkey boilers and engine, and is fitted with a distilling apparatus. Her electric plant consists of two 4-inch double-cylinder engines, with suitable generators, and are intended not only to thoroughly light the interior of the ship, but to run the flashing electric lights at the two mastheads. Her fog-signal machinery consists of a horizontal noncondensing steam engine, about 5 inches diameter of cylinder and 6 inches stroke, able to make about 120 revolutions a minute, and is attached to the machinery for operating the Crosby chime steam whistle. Her gross tonnage under the main deck is about 350 tons. Her speed will probably be about 8½ knots.

NOTE.—This vessel was placed on her station on September 30, 1897.

Relief light-vessel for the Fifth light-house district.—There are several important light-vessels in the Fifth light-house district, and the new light-vessel for Diamond Shoal will be placed on her station early in the coming fiscal year. If it should become necessary to temporarily withdraw one of these vessels for repair there is no relief vessel to replace it. It is estimated that one can be built for not exceeding $80,000, and it is recommended that an appropriation of this amount be made therefor.

FOG SIGNALS OPERATED BY STEAM OR HOT-AIR ENGINES.

488. *Cape Charles light-vessel, No. 49, entrance to Chesapeake Bay, Virginia.*—This 12-inch steam whistle was in operation some 120 hours during the year, and consumed about 20 tons of coal.

490. *Cape Henry, entrance to Chesapeake Bay, Virginia.*—This first-class steam siren was in operation some 197 hours, and consumed about 17 tons of coal.

Fifth District.

520. Wolf Trap, Chesapeake Bay, Virginia.—This second-class Daboll trumpet, operated by a petroleum engine, was in operation some 235 hours, and consumed about 112 gallons of mineral oil.

529. Smith Point light-vessel, No. 46, off the mouth of the Potomac River, Virginia.—This 12-inch steam whistle was in operation some 195 hours during the year, and consumed about 14 tons of coal.

DAY OR UNLIGHTED BEACONS.

The day beacons in the district are in good condition, having received such attention from time to time as was necessary. Lower Cedar Point beacon was changed to a beacon light on September 5, 1896.

POST AND BEACON LIGHTS.

The post lights in York River, Virginia, and Elk River, Maryland, were well attended to during the year and continue to give satisfaction. On February 1, 1897, a beacon light was established on Reeds Point Shoal, off the mouth of Perquimans River, North Carolina, and on April 15 beacon lights were established at Johnson Point, Lower Green Springs, and Upper Green Springs, Neuse River, North Carolina, thus lighting this river to Newbern.

BUOYAGE.

The buoyage of the entire district was cared for by the tenders, and is in a very satisfactory condition. The loss of buoys and appendages by ice during the past winter was very light, spars having been substituted for iron buoys before any ice made in the bay. The dredged cut through Wallace Channel, Ocracoke Inlet, North Carolina, was marked by buoys so as to make it available for navigation, and when the work of improvement was finished, the channel was marked for its entire length. Three pile buoys in Wicomico River, Eastern Shore of Maryland, were changed to spars, and a spar buoy marking a wreck in Hampton Roads, Virginia, was discontinued, the wreck having broken up. A bell buoy was substituted for Sewall Point Shoal buoy, No. 3, Hampton Roads, Virginia; buoy No. 10 in Neuse River, North Carolina, was changed from a spar to a second-class nun, and a red and black horizontally striped spar buoy was established to mark the wreck of the sunken barge *Rose Hagan*, off the mouth of Sassafras River, head of Chesapeake Bay. The wreck of the steamer *Nellie White*, near Sandy Point, Maryland, was again marked by a spar buoy, the former buoy having been discontinued some two years ago, and another spar was established in Baltimore Harbor, to indicate the entrance to the dredged channel into the Martin Wagner Company's wharf. A gas buoy was substituted for the first-class can buoy marking the edge of Ragged Point Shoal, Potomac River, Virginia; a spar buoy was established in the fairway off

Newport News Middle Ground, Virginia; the buoy off Reeds Point Shoal, Perquimans River, North Carolina, was discontinued, as a beacon light marked the shoal, and seven buoys were placed in Chesapeake Bay between James Point and Point No Point, Maryland, to mark the trial course for torpedo boats. A wreck buoy was placed off Watchapreague Inlet, Virginia; buoys Nos. 4 and 7 in Pamlico River, North Carolina, were changed from spars to iron buoys; a third-class can buoy was established to mark the edge of the shoal off Fork Point Island, Pamlico River, North Carolina, and buoys Nos. 1 and 2, Perquimans River, North Carolina, were changed from spars to iron buoys. Four new buoys were established in Bogue Sound, North Carolina, to mark the channel to Carolina City, and the gas buoy off Tangier Island Spit, Chesapeake Bay, Virginia, was discontinued and a first-class can buoy was substituted.

DEPOTS.

Lazaretto Point, Baltimore, Md.—The tramway was repaired. The drainpipe was renewed, and 36 feet of beveled strips were nailed along the rails in order to allow vehicles to cross the tramway. The depot is in good condition.

The following recommendation, made in the Board's last seven annual reports, is renewed:

> Attention is invited to the necessity of providing a dwelling at this depot for the accommodation of the depot keeper and his family. Their quarters in the warehouse are unsuitable and uncomfortable, and even were the rooms not required for other purposes it would cost nearly as much to make them comfortably habitable as it would to build a new dwelling. About one-third of the space on the upper floor is reserved for the use of custom-house inspectors, and the large and increasing amount of work on hand in the district demands the use of all storage and shop room available. The depot keeper must be constantly on the spot, and can not live away from the premises. There is ample room on the Government tract for such a building as is required, and it can be built for $2,500. An appropriation of this amount is earnestly recommended.

Portsmouth, Va.—Contracts were made for furnishing materials for building a wharf on the water front purchased in 1892, and the work will be begun as soon as practicable.

Point Lookout, Maryland.—Arrangements were concluded for the purchase of materials for repairing the wharf and coal shed, and the work will soon be begun.

Annapolis, Md.—Materials for rebuilding the old wharf have been contracted for, and operations will be commenced as soon as practicable.

TENDERS.

The Maple.—This steel twin-screw steamer steamed about 19,116 miles on a consumption of some 1,524 tons of bituminous coal. In August, 1896, she made a trip to New York for annual supplies, and the Secretary of the Treasury took advantage of the trip to inspect the service. In September she was docked, her bottom was cleaned and painted, the machinery was overhauled, the upper deck was re-covered with canvas, all the woodwork and hull painted, and such repairs as were needed to fit her for winter service were made. In November, while inspecting Hog Island light-station, Virginia, she grounded in Sand Shoal Inlet, and on account of the low run of tides could not be floated for several days. She received no damage from this accident. In January, Winter Quarter Shoal light-vessel, No. 45, Virginia, went adrift and put into Portsmouth, Va. After being supplied with new moorings she was replaced on her station by this tender. In April the *Maple* came to Baltimore, where she was docked, her bottom cleaned and painted, a new wheel put on, the stern bearings and shafts were overhauled and repaired, the ironwork of the derrick mast was taken off and replaced by new work, and the vessel was painted inside and out. On April 22, 1897, she went to New York and took part in the inauguration of the Grant tomb, at Riverside Park, and returned with a load of annual supplies, reaching Portsmouth, Va., on April 30. She was employed 51 days on inspection duty, 106 days working buoys and attending to light-vessels, 80 days delivering supplies and rations to light-stations, 18 days under repair, and 30 days at depots coaling, loading supplies and buoys, or doing other necessary work. She worked 600 buoys, visited 65 light-stations, delivered 240 tons of coal and 200 cords of wood to stations and light-vessels, furnished rations to 40 stations, transported the inspector to 63 stations for inspection, and the crew were employed 40 days at the buoy depots.

The Violet.—This wooden side-wheel steamer, except when under repair, was actively employed in the work of the district. In October, 1896, the woodwork was cleaned and painted, a new donkey pump was put in place, the wheels were refitted with new buckets, and all needed repairs were made. In February the boiler was blown off, several patches were put on the legs, and it was thoroughly cleaned, and in April the engine was lined up, the steam valves were refitted, and some minor repairs were made. She steamed about 13,457 miles on a consumption of some 809 tons of bituminous coal. She was employed 84 days inspecting lights, 92 days working buoys and attending to light-vessels, 76 days delivering fuel, rations, and supplies, 69 days at depots coaling, loading supplies, painting buoys, or doing other necessary work, and was 18 days under repair. She worked 610 buoys, made 241 visits to light-stations, delivered 124 tons of coal and 73 cords of wood, furnished 18 stations with rations, inspected 75 stations, and the crew was employed 24 days at the buoy depots.

The Bramble.—This steel twin-screw steam launch was actively employed in attending to the beacon lights in Currituck Sound, North Carolina, and adjacent waters, and in so doing she steamed some 1,351 miles on a consumption of about 32 tons of bituminous coal. In June she transported the supplies required for the beacon lights during the next fiscal year from Portsmouth, Va., to Long Point, North Carolina. Such repairs as were needed were made by the crew.

The Jessamine.—From November 1 to December 8, 1896, this steamer was laid up to receive necessary repairs to the boiler and woodwork. She was also docked and the bottom was cleaned and painted. During the rest of the year she was constantly employed in the inspection of light-stations with a view to needed repairs and of new works in process of construction; in making borings at Ragged Point, Potomac River, in connection with the proposed establishment of a light-house; in setting up illuminating and fog-signal apparatus at Cedar Point light-station, Maryland; in making examinations for proposed beacon lights in the Scuppernong and Neuse rivers, North Carolina; in staking out the site of Smith Point light-house, Virginia; in changing the lens at Old Plantation Flats light-station, Virginia, and in the transportation of tramway rails from the Cape Charles station to Portsmouth, Va., for use on the new wharf for the depot there. She assisted in the rebuilding of the Lower Cedar Point light-house, Maryland; in the erection of beacons at Reeds Point, Johnson Point, Upper Green Spring, and Lower Green Spring, North Carolina, and of the oil house at Leading Point, Maryland; in the repairs of 28 light-stations, and in driving a test pile at the new site of the Baltimore light-house, Maryland. On this duty she ran about 5,029 miles and used some 454 tons of coal.

The Thistle.—This steam tug was transferred to the Fourth light-house district on July 27, 1896. She remained there until December 14, when she returned to Baltimore and was employed in the Fifth district until April 13, 1897, when she was again turned over to the Engineer of the Fourth light-house district. She was of assistance in the repairs of the North Carolina light-stations, towing scows with material for this purpose and attending upon the working parties.

SIXTH DISTRICT.

This district extends from, but does not include, New River Inlet, North Carolina, to and including Jupiter Inlet light-station, Florida. It embraces all aids to navigation on the seacoasts, bays, sounds, harbors, rivers, and other tidal waters of North Carolina, South Carolina, Georgia, and Florida between the limits named.

Inspector.—Commander Seth M. Ackley, United States Navy.

Engineer.—Capt. Frederic V. Abbot, Corps of Engineers, United States Army.

In this district there are—

Light-houses and beacon lights, including 112 post lights	204
Light-vessels in position	3
Day or unlighted beacons	41
Fog signals operated by steam	2
Fog signals operated by clockwork	3
Whistling buoys in position	7
Bell buoys in position	16
Other buoys in position	283
Steamer *Wistaria*, buoy tender, and for inspection and supply	1
Schooner *Pharos*, for construction and repair	1
Naphtha launch *Water Lily*, for inspection and supply	1
Naphtha launch *Snowdrop*, for construction and repair	1

LIGHT-STATIONS.

—. *Cape Fear, seacoast of North Carolina.*—The following statement, which was made in the Board's last eight annual reports, is renewed:

> **The shoals forming the continuation of this cape for about 18 miles to the southeast are dreaded by shipmasters only a little less than those at Cape Hatteras. At present a light-ship near the outer extremity of the shoals warns vessels of danger and gives them a good point of departure. This aid to navigation can not be dispensed with; but it is not sufficient to insure adequate protection to the large number of domestic and foreign vessels attracted to this point by the considerable and increasing trade of the neighboring port of Wilmington, N. C., because of the small area lighted by it, and because of its liability to be set adrift from its moorings during heavy storms, which is the very time when its light is most needed. The present Cape Fear light, on account of its inland position and want of height, does not cover the shoal, and therefore does not give sufficient warning to vessels when the light-ship may have drifted from her moorings. A first-order light-house built on the pitch of Cape Fear, with a radius of 18¼ miles of light, would be seen so far as to give timely warning, and the fact of being near enough to the coast to see it would be a sufficient indication that the observer should make a better offing. Other reasons for a first-order light-house here may be found in the better protection it would afford to the bight lying north of the cape, which has been left dark since the discontinuance of Federal Point light-station in 1880. The proposed light would**

more than compensate for the one discontinued at Federal Point. It may be proper to add that there is no first-order light-house between Cape Lookout, North Carolina, and Cape Romain, South Carolina, a distance of about 170 nautical miles. Recent changes in the lighting of the entrance to Cape Fear River have almost eliminated the Cape Fear light-house as a harbor light. Its only use is that of a rear beacon to a stake light forming a range to guide up the river after crossing the bar. Upon the establishment of the proposed new light on the pitch of Cape Fear the old light might be discontinued, as the tower and the keeper's dwelling are antiquated and discreditable to the Light-House Establishment.

Urgent petitions have been presented to the Light-House Board by commercial and pilot associations of Wilmington, N. C., and by shipmasters trading to that port, which have had its careful consideration and approval.

It is estimated that a tower 150 feet high, with suitable oil room, keeper's dwellings, and outbuildings, on the pitch of Cape Fear, will cost $70,000, and it is recommended that this amount be appropriated therefor.

621. Cape Fear, entrance to Cape Fear River, North Carolina.—As it is proposed to discontinue this light upon the establishment of a first-order tower upon the pitch of Cape Fear, only urgent repairs were made.

622, 623. New Channel post light range, Cape Fear River, North Carolina.—A shifting of the channel at the mouth of the Cape Fear River, through which this range was intended as a guide, rendered necessary a change of the positions of the beacons. Two new structures were accordingly built, corresponding to the new channel, and were lighted.

—. *Range lights for new dredged channels in Cape Fear River, North Carolina.*—The following recommendation, made in the Board's last five annual reports, is renewed:

> The Board recommended the discontinuance of 10 of the present post lights in the upper part of the Cape Fear River and the establishment of 24 new post lights, which, in connection with certain other ranges already established, would constitute a system of ranges to guide vessels from the Cape Fear entrance to Wilmington, N. C., through channels dredged to a depth of 20 feet at mean low water. As vessels are now carried by ranges one-half the distance between the entrance and Wilmington, and then left without further adequate guidance, the Board is of opinion that to complete the usefulness of the aids to navigation in the lower part of the river similar aids should be provided to guide them to their port of destination. It is estimated that this can be done at a cost not to exceed $3,105, and it is recommended that an appropriation of that amount be made for this purpose.

These channels have already been dredged to the depth of 18 feet.

—. *Bull Bay Pierhead, Bull Bay, South Carolina.*—Owing to a decrease in the number of vessels using this light, it was, on November 11, 1896, permanently discontinued.

652. Bull Bay, South Carolina.—The erosion of this site by the sea continued until the southeast corner of the building which carried the tower was undermined, and there was danger that the whole structure would be washed down, with the loss of the apparatus. Hence the light was discontinued and valuable parts of the house and the illuminating apparatus were taken to Charleston, S. C. By the sundry civil act approved June 4, 1897, an appropriation of $10,000 was made for the reestablishment of the station on a new site, and negotiations for the purchase of a site were begun.

670. Shutes Folly Island Spit beacon, South Carolina.—On March 15, 1897, the color of this light was changed from white to red, to avoid confusing it with lights of shipping in the stream close by.

676, 677. Hilton Head Range, South Carolina.—The channel across the bar, through which this range is intended to guide, continued to shift to the southward, so as to make necessary a change in the position of its front beacon. Soundings on the bar showed the best water to be on a line from the rear beacon passing 63 feet to the south of the front beacon, and in January, 1897, the latter was moved to a new site on this line. A new foundation was prepared for it and 10 acres of dense woods were cut down to clear the range of obstructions. The lights were shown uninterruptedly. Various repairs were made.

682, 683. Bloody Point Range, South Carolina.—The boathouse was set back 250 feet, and 80 feet of new plank walk was built. The embankment between the beacons was raised to grade. Various repairs were made. The sea is encroaching seriously on the site, and it is probable that all the structures at the front beacon will require removal in the near future.

691, 692. Tybee Knoll Cut Range, Georgia.—Some 820 feet of plank walk which had been overturned by a cyclone was replaced. Various repairs were made.

695. Venus Point, Savannah River, South Carolina.—The boat landing and approaches were seriously injured by the cyclone of September 29, 1896. They were replaced by a structure of twenty-four heavy piles well driven, and 160 feet of additional plank walks were built.

696. Jones Island, Savannah River, South Carolina.—The boat landing and approaches were seriously injured by the cyclone of September 29, 1896. They were replaced by a structure on 12 heavy piles well driven, and 90 feet of additional plank walks were built.

697, 698. Elba Island Range, Savannah River, Georgia.—New locomotive headlight lanterns were furnished for both front and rear beacons.

702, 704. Oglethorpe Range, Savannah River, Georgia.—The boat landing and plank walk at the rear beacon were damaged on September 29, 1896, and were replaced by a new structure on substantial piles.

708, 709. Fig Island Range, Savannah River, Georgia.—The wooden front beacon, built on four piles in the Savannah River in 1880, was twisted by the cyclone of September 29, 1896. It was replaced with a new structure. The light was transferred to the new beacon in October, 1896. The rear beacon was furnished with a new locomotive lantern.

Sixth District.

710. St. Catherines Sound, seacoast of Georgia.—Proceedings de novo for the condemnation of the land on St. Catherines Island selected as a site for this station had been instituted by the United States attorney for the southern district of Georgia. In January, 1897, at a session of the United States court held at Savannah, Ga., the defendants set up in reply the plea of res adjudicata, claiming that this was a renewal of the same case which in the preceding year had been dismissed by the same court upon the ground that the United States had not sufficient authority to condemn the land. The United States attorney, not being prepared to answer this plea, asked for instructions, pending the receipt of which the court adjourned. No further progress has been reported in the suit. Meantime no work has been done on the site.

715, 716. St. Simon Range, entrance to St. Simon Sound, Georgia.—The front beacon was destroyed by the cyclone of September 29, 1896, and was replaced by a new structure during October, 1896.

717–722. Brunswick Harbor Ranges, Georgia.—These six beacons are situated in the waters of Brunswick Harbor. In very stormy weather they are unapproachable by their keepers. A long-lived locomotive headlight lamp, which would burn continuously without attention for a period of 63 hours, was devised for them, and was substituted for the ordinary locomotive light, and has worked satisfactorily.

—. *The inside passage from Savannah, Ga., to Fernandina, Fla.*—In its last eight annual reports the Board recommended that it be empowered to erect and maintain 25 post lights, in order to facilitate the navigation of the inland passage from Savannah to Fernandina, at an estimated cost of $4,000. An appropriation of this amount has been recommended. This recommendation is renewed.

724, 725. Amelia Island Range, Fernandina entrance, Florida.—The temporary movable beacons, used for this range since the permanent ones were discontinued as misleading, were supplied with lens lanterns in place of the Funck lanterns. The channel, however, has shifted so far to the southward and changed its direction so much that even these movable lights can not now be placed so as to guide through the best water. Until the channel becomes more fixed, buoys will be the only available guides across the bar. Extensive repairs were made to the keeper's dwelling. Some 250 feet of new picket fence was built; also 32 feet of sand breaks, to stop the advance of encroaching sand dunes. Various other repairs were made.

732–737. St. Johns River entrance beacons, Florida.—These six beacons, five of them located in the water, were lighted on August 26, 1896. The channel through which the Mayport Range was intended to guide has shifted so much to the southward as to make the range lead over a shoal. Until the new channel becomes more stable, buoys will be the most reliable guides.

Sixth District.

738–814 and 816–824. St. Johns River post lights.—Most of these lights have been well attended. Light No. 29 was discontinued on June 1, 1897, and light No. 41 was discontinued June 30, 1897.

—. *Indian River post lights, Florida.*—These lights were discontinued on July 1, 1896, the quantity of shipping on the river not warranting the expense of their continued maintenance.

—. *Reimbursement of light-keepers for personal losses sustained during the cyclones of August 27 and 28, 1893.*—The following statement, made in the Board's last three annual reports, is repeated:

> A number of keepers of light-houses, the officers and crew of a light-vessel, and the keeper of a buoy depot sustained more or less heavy personal losses when the stations where they were employed were wrecked. Many of them displayed much devotion to the service and incurred great personal danger.
>
> The Board therefore brought these matters to the attention of the honorable Secretary of the Treasury, and he, in letters of November 9 and 16, 1893, and January 29, 1894, to the Speaker of the House of Representatives, transmitted the sworn statements of each keeper as to his losses, indorsed by Commander M. R. S. Mackenzie, United States Navy, inspector of the Sixth light-house district, and recommended that provision be made by Congress for the reimbursement of the losses sustained by these keepers. The losses, as shown in these statements, amount to $2,399.13. Recommendation is made that an appropriation of that amount be made for the reimbursement of losses sustained by the light-house employees in the Sixth light-house district.
>
> Similar losses were sustained by light-keepers in the Eighth light-house district during the hurricane of October 1, 1893. Statements of the losses they sustained, duly approved and indorsed by the light-house inspector, were sent to the Speaker of the House of Representatives by the Treasury Department in its letters of January 29, March 7, and April 3, 1894, with recommendation that reimbursement be made. The sum of these losses, as stated, amounts to $2,603.62. Recommendation is made that an appropriation of this amount be made for the reimbursement of the losses sustained by light-house employees in the Eighth light-house district.

REPAIRS.

At each of the following-named stations repairs of greater or less extent were made during the year:

651. Cape Romain, S. C.
654, 655, 656. Charleston and Morris Island North and South ranges, S. C.
657, 658, 659. Sullivans Island East and West ranges, S. C.
661. St. Philip's Church rear beacon of Swash Channel Range, S. C.
664. Sullivans Island Cove Pierhead, S. C.
667, 669. Hog Island Channel beacons, S. C.
671–673. Wadmalaw River beacons, S. C.
674. Hunting Island, S. C.
678, 679. Paris Island Range, S. C.
680, 681. Daufuskie Island Range, S. C.
688. Cockspur Island, Ga.
730. Amelia Island, Fla.
815. Volusia Bar, Fla.
826. Mosquito Inlet, Fla.

LIGHT-VESSELS.

620. Frying Pan Shoals light-vessel, No. 1, off the coast of North Carolina.—On November 1, 1896, this vessel, which was formerly on

Martins Industry Shoal, was withdrawn from her station and brought to Charleston for some minor repairs, and was replaced temporarily by relief light-vessel No. 29. On November 11 she was placed permanently on Frying Pan Shoals, North Carolina. As light-vessel No. 53 is of iron, it is necessary to dock her yearly, and by placing light-vessel No. 1 on this station and No. 53 on Martins Industry the distance necessary to move her is reduced one-half. On December 2, 1896, during a northeast gale, light-vessel No. 1 broke adrift from her station and was replaced by the light-house tender three days later. She required slight repairs during the year and is in good condition.

653. Charleston light-vessel, No. 34, off Charleston Harbor, South Carolina.—This vessel is now in need of a new mast, and a new stick has been procured and will be put in as soon as practicable. She has not been off her station during the year.

675. Martins Industry light-vessel, No. 53, off the seacoast of South Carolina.—On November 11, 1896, light-vessel No. 53 was permanently withdrawn from Frying Pan Shoals and brought to Charleston, where she was hauled out, scraped, and painted. Some rivets were renewed, the hull was caulked, the machinery was overhauled, and all the auxiliary machinery was supplied with new brass steam connections. New flanges and valve stems were fitted to nearly all the globe valves, new valve stems to the main engine and feed pumps, and new blowpipes to each boiler. Some small repairs were made to the boilers. The machinery is now in good order. This work was all done by the crews of the tender *Wistaria* and the light-vessel, assisted by two hired machinists. On December 23, 1896, she was placed on Martins Industry Shoal light-vessel station, and light-vessel No. 29 was taken to Charleston. As light-vessel No. 53 is of iron, it is necessary to dock her each year. By placing light-vessel No. 53 on this station and light-vessel No. 1 on Frying Pan Shoals, the distance necessary to move her is reduced one-half.

Relief light-vessel No. 29.—This ship, which is stationed at Charleston, S. C., and kept as a relief light-vessel, has been very useful. On November 1, 1896, she relieved light-vessel No. 1 on Martins Industry Shoal, when that vessel was permanently withdrawn from that station. On December 23, 1896, light-vessel No. 29 was withdrawn from Martins Industry Shoal and was permanently replaced by light-vessel No. 53. This relief light-vessel was repaired during the year. She was supplied with new awnings, sails for boat, two new boats, new companion way, new hatch, new grating around her wheel, new jaws for the main gaff, new hawse pipe, a windlass barrel made complete, and a gallows frame under her forward lamp house. A foremast has been procured for her, and it will be put in as soon as practicable.

Sixth District.

DAY OR UNLIGHTED BEACONS.

There are in this district 41 day or unlighted beacons, most of which are in good condition.

East Marsh Island, Accabee Flats, Ashley River, South Carolina.—This day mark was destroyed, probably by a passing vessel. A new one was built—a single-pile beacon with boards colored red nailed across at right angles.

FOG SIGNALS OPERATED BY STEAM.

620. Frying Pan Shoals light-vessel, No. 53, seacoast of North Carolina.—This 12-inch steam whistle was in operation some 80 hours, and consumed about 9 tons of coal and three-fourths of a cord of wood, as there was more fog than usual.

675. Martins Industry light-vessel, No. 1, seacoast of South Carolina.—This 12-inch steam whistle was in operation some 259 hours during the year, and consumed about 20 tons of coal and half a cord of wood, as there was about double the usual number of hours of fog during this year.

BUOYAGE.

Few buoys went adrift during the year. The buoys were relieved, except some few north of and at Charleston, which will be relieved upon the return of the tender *Wistaria* from Wilmington, Del. Eight buoys were discontinued; 3 were established; 4 were replaced; 7 were changed; 1 was recovered, and 18 were repaired. Ten sinkers and 400 split keys, and 10 bell-buoy disks and balls complete, were procured in the district. Four second-class can and 6 second-class wooden-spar buoys were received from the General Light-House Depot. As fast as the tubes on bell buoys have been disabled, the buoys have been brought in and converted into disk buoys.

DEPOTS.

Castle Pinckney, Charleston Harbor, South Carolina.—Some 21 fender piles were driven to replace those destroyed by the teredo. A new 25-foot catboat, for the transportation of stores from Charleston and for attending the Charleston Harbor lights, was built by the crew of the *Water Lily.*

Depot for the Sixth light-house district.—The following recommendation, made in the Board's last annual report, is renewed:

> The present depôt is on a small marshy island in the harbor at Charleston. It is exposed to storms, and was partly destroyed by the hurricane of 1893, when many stores and much material was lost and heavy damage was inflicted on the wharf and buildings. The same hurricane nearly wrecked one of the light-house tenders which

was then lying at the custom-house wharf in Charleston. A suitable depot is much needed in this district for the storage of building materials and supplies, spare buoys, etc., and one which can afford safe harbor for light-house vessels. It should be located at some point sheltered from the violent storms prevalent on the southern coast during certain seasons of the year. It is estimated that a proper depot can be established for $35,000, and it is recommended that an appropriation of this amount be made therefor.

TENDERS.

The Wistaria.—This iron side-wheel steamer was constantly employed. She replaced and relieved 271 buoys, repaired 17, relieved 5, repainted 405, repaired 87 buoy chains, and did some 28 days' work at the depot. During each quarter she took the inspector on his quarterly inspection trips, and supplied all of the light-vessels with rations and fuel. She towed the light-vessels from and to their stations, taking the relief light-vessel to Martins Industry Shoal and bringing light-vessel No. 1 to Charleston. She then towed light-vessel No. 1 to Frying Pan Shoals and brought light-vessel No. 53 back to Charleston. She towed light-vessel No. 53 to Martins Industry Shoal and brought light-vessel No. 29 to Charleston. On December 2, 1896, light-vessel No. 1 went adrift from Martins Industry Shoal. The *Wistaria* found her off Charleston and on December 5 put her back on her station. The steamer steamed about 12,006 miles, and consumed some 784 tons of coal and 6 cords of wood. She was in motion 55 days and 14 hours, was some 192 days under steam, and was about 174 days without fires. She had steam on her donkey boiler about 38 days. She was at the dock for minor repairs to hull and machinery some 30 days. Her machinery and boiler and woodwork required considerable repairs, and she left Charleston for Wilmington, Del., on June 30, 1897, for a general overhauling. Her 24-foot naphtha launch was quite useful, and was of great assistance in sounding channels and inspecting work.

The Pharos.—This schooner was engaged in the construction of the St Johns River entrance range beacons, Florida, and the substitution of lens lanterns for Funck lanterns on the Amelia Island and Tiger Island north ranges. During August and September she was used in the construction of New Channel range beacons, North Carolina, in repairing Cape Fear light-station, and in taking photographic views of five light-stations in the northern part of the district. During October and November, 1896, she was employed in repairing Venus Point, Jones Island, Oglethorpe, and Fig Island light-stations, Savannah River, Georgia. During December, 1896, January, February, and March, 1897, she was engaged in moving the front beacon of the Hilton Head range and in repairing that station and Daufuskie Island and Bloody Point light-stations, and in dismantling Bull Bay, South Carolina, light-station. During April, 1897, she was engaged on the

Sixth District.

repairs at Amelia Island and Tiger Island ranges, Florida, and returne to Charleston, since which time she has been laid up, with the greate part of her crew detailed for duty on the launch *Snowdrop*. She, how ever, was used in rebuilding Moultrieville beacon No. 2, and in repai ing Sullivan Island Cove, and Wadmelaw, South Carolina, rive beacons. Her rigging was overhauled, her ballast was arranged, he bottom was cleaned, and her decks were caulked.

Launch Water Lily.—This 65-foot twin-screw naphtha launch wa quite a useful vessel. She was engaged in dismantling the post light in the Indian River, Florida, and collecting the Government propert from the keepers, transporting the oil and empty cans to Jupiter Inle and Mosquito Inlet light-stations, and in bringing the other stores t Charleston. Her presence on the St. Johns River, Florida, materiall added to the efficiency of the aids to navigation on that river. Whil on that river, besides being used in inspecting all the lights and bea cons, her crew built three 3-pile beacons and one 4-pile structure, an repaired 12 and repainted 65 beacons. Her crew also built a 25-foo boat for the use of the depot. At various times she was used to trans port such keepers as had been transferred from one station to another to inspect 85 lights, and to deliver supplies to various light-stations Her master and crew were engaged for twenty days on relief light-vessel No. 29 in making repairs. They were also employed 27 days in overhauling and repairing engines and other work. The *Lily* steamed 4,205 miles and consumed 7,249 gallons of naphtha. During the unavoidable absence of the *Wistaria* this launch has been of great assistance in making the quarterly inspections, especially at stations on the inside passages.

The Snowdrop.—A cabin naphtha launch, 65 feet long, 10½-feet beam, and 36-inch draft, with two 12-horsepower engines, and a speed of 8½ miles an hour, was obtained by contract in New York. In January, 1897, the launch made a trial trip, and showing a speed of 9.1 miles an hour, and coming up to specifications in other respects, was accepted. Ice in the canals prevented her leaving New York for Charleston until March 15, 1897. After being detained by bad weather at several places on her passage, she arrived on April 12, 1897, at Charleston, S. C. Some alterations were made to increase her accommodations fo the working party, and in May, 1897, having received a mate and fiv of the *Pharos'* crew, she was used in making repairs at Cape Romain South Carolina, light-station. During June, 1897, she was engaged i making repairs at Paris Island, South Carolina, and Volusia Ba Florida, light-stations.

7

SEVENTH DISTRICT.

This district extends from a point just south of Jupiter Inlet light-station to and including Perdido entrance, Florida. It embraces all aids to navigation on the sea and Gulf coasts of Florida, and on other tidal waters tributary to the sea and Gulf between the limits named.

Inspector.—Commander William B. Newman, United States Navy, until November 7, 1896; since then, Commander Samuel Belden, United States Navy.

Engineer.—Maj. James B. Quinn, Corps of Engineers, United States Army, to May 25, 1897; since then, Lieut. Col. A. N. Damrell, Corps of Engineers, United States Army.

There are in this district—

Light-houses and lighted beacons	53
Day or unlighted beacons	35
Whistling buoys in position	3
Bell buoys in position	5
Other buoys in position	261
Steamer *Laurel*, buoy tender, and for supply and inspection	1
Steamer *Arbutus*, for construction and repair in the Seventh and Eighth districts	1
Schooner *Clover*, for construction and repair in the Seventh and Eighth districts	1

The office of the inspector was transferred from Pensacola, Fla., to Key West, Fla., on May 9, 1897. The office of the engineer was on May 25, 1897, transferred from New Orleans, La., to Mobile, Ala.

LIGHT-STATIONS.

—. *Hillsboro Inlet, off Hillsboro Point, between Jupiter Inlet and Fowey Rocks lights, Atlantic coast of Florida.*—The following recommendation, which has been made in several previous annual reports of the Board, is renewed:

> The establishment of a light at or near Hillsboro Point, Florida, would be of great assistance to all vessels navigating these waters. Steamers bound southward, after making Jupiter Inlet light, hug the reef very closely to avoid the current. The dangerous reef making out from Hillsboro Inlet compels them to give it a wide berth and to go out into the Gulf Stream. Vessels coming across from the Bahama Banks would be able to verify their position if a light were placed here; a difficult matter in case they fail to make Jupiter Inlet. The establishment of this light would complete the system of lights on the Florida reefs. The Board therefore renews the recommendation that $90,000 be appropriated for this purpose.

829. *Fowey Rocks, northern extremity of Florida Reefs, Florida.*—The light tower was thoroughly scaled, scraped, and painted.

830. *Carysfort Reef, near the edge of the Gulf Stream, Florida Reefs, Florida.*—This skeleton iron structure was thoroughly scaled, scraped, and painted.

Seventh District.

831. Alligator Reef, Florida Reefs, Florida.—This skeleton iron tower was thoroughly scaled, scraped, and painted. Various repairs were made.

832. Sombrero Key, on Sombrero Shoal, Florida Reefs, Florida.—This skeleton iron structure was thoroughly scaled, scraped, and painted. Various repairs were made.

833. American Shoal, Florida Reefs, Florida.—This tower was scaled, scraped, and painted.

834. Sand Key, near Key West, Gulf of Mexico, Florida.—This tower was scaled, scraped, and painted. Various minor repairs were made.

840. Sanibel Island, entrance to San Carlos Harbor and port of Punta Rassa, Florida.—A survey was made of this reservation, and a barbed wire fence was erected to mark the northern boundary line. A new cistern was put up and the old one was repaired.

846. Egmont Key, entrance to Tampa Bay, Florida.—The wharf was repaired by hired labor and purchase of materials. A floating pile driver was hired for driving piles for the wharf. After the piles were driven they were covered with cast-iron sleeves and the interstices were filled with cement. Twenty piles were put down in clusters, forming fender piles, and the heads were bound together with $\frac{3}{4}$-inch chain. The caps to the main wharf were placed and fastened to the bunter with driftbolts and to piles with lag screws. The joists and decking on the T-part of the wharf and approach to the coal shed were repaired. A new deck was put on the buoy car, the car track was relaid, the walks, etc., were repaired, and various minor repairs were made. A new dwelling is needed for the assistant keeper. It has been recommended in the Board's last four annual reports. It is now estimated that it can be built for $3,500, and it is recommended that an appropriation of this amount be made therefor.

—. *Terra Ceia Bay Beacons, Florida.*—The shipments of vegetables and fruit from the country surrounding Terra Ceia Bay are large, and it is claimed that they are increasing. The surrounding land is being converted into vegetable and fruit farms. There were, when last heard from, four steamers making daily trips from Tampa and Port Tampa to Manatee River and Terra Ceia Bay, bringing down building materials chiefly and returning with vegetables, which are shipped North. During the winter large quantities of oranges are shipped. Some aids to navigation should be placed to aid this growing commerce. It is proposed to place some six beacons to mark the entrance to the channel. It is estimated that it will cost $2,100 to do this, and it is recommended that an appropriation of this amount be made therefor.

857. Cedar Keys, Gulf of Mexico, Florida.—The repairs made necessary by the storm of September 28 and 29, 1896, were done by hired labor and the purchase of materials in conjunction with the use of the tender *Clover.*

Seventh District.

870. Apalachicola Bay front beacon, on the dredged channel leading into Apalachicola Bay, Florida.—The following recommendation, which was made in the Board's last three annual reports, is renewed:

> This beacon was erected in 1887, and paid for from the special appropriation for Apalachicola Bay range lights, Florida. In August, 1890, the beacon was destroyed by a tug; it was rebuilt, and destroyed again by the same tug and a tow of barges in November, 1891; it was restored the second time, and was again knocked down by a tug in February, 1894. A single-pile beacon was established in its place by local interested parties. From an examination of the foundation soil it is evident that it would be imprudent to erect an ordinary pile beacon. It is therefore recommended that a more substantial structure be placed there, on a pile and concrete foundation, with a cylindrical concrete superstructure. It is estimated that the construction of such a beacon will cost not exceeding $7,000, and it is recommended that an appropriation of this amount be made therefor.

872. Cape San Blas, Gulf of Mexico, Florida.—The appropriation for this work having been exhausted, nothing was done during the past fiscal year beyond the care of the materials at the site. The sundry civil appropriation act approved June 4, 1897, appropriated $4,500 for completing the removal of Cape San Blas light-station, Florida, to Black's Island.

875. Pensacola, Pensacola Bay, Gulf of Mexico, Florida.—A frame addition to the rear of the dwelling, as a kitchen, was erected and the dwelling and illuminating apparatus was thoroughly repaired.

—. *Choctawhatchee beacons, Choctawhatchee Bay, Florida.*—Plans and specifications were prepared for the erection of two beacons to mark the entrance to Choctawhatchee Bay from Santa Rosa Sound, Florida. Proposals for their erection were asked and the contract was given to the lowest bidder. It is expected that they will be lighted early in 1898.

—. *St. Joseph Point, St. Joseph Bay, Gulf coast of Florida.*—The following recommendation was made in the Board's annual reports for nine successive years:

> The fishing fleet on this coast is large. A southerly gale is calculated to drive these vessels upon a lee shore. The only harbor of refuge for some 60 miles is St. Joseph Bay. This is easily accessible in the daytime, but at night it is difficult of entrance without a light. The Board is decidedly of opinion that it would be largely to the interests of the fishing fleet in particular, and the commerce and navigation of the Florida coast in general, should this light be established. A bill for this purpose was favorably reported upon recently by the Senate Committee on Commerce, and the Senate inserted the item in the sundry civil appropriation bill, but as it failed of enactment the recommendation is renewed.

It is now estimated that a sufficient light can be established here for $15,000, and it is recommended that an appropriation of this amount be made therefor.

879. Fort Barrancas Range, front, Pensacola Bay, Gulf of Mexico, Florida.—The dwelling was thoroughly repaired and a new frame addition was made to the old structure, with a verandah. The addition contains two rooms, kitchen and dining room. A new brick chimney was put up in the dining room. A new cistern was put up and placed on a foundation of nine brick piers. A platform was built in front of the cistern as an extension of the kitchen gallery, inclosed with rails.

REPAIRS.

At each of the following-named stations repairs, more or less extensive, were made during the year:

837. Rebecca Shoal, Fla.
838. Dry Tortugas, Fla.
842. Gasparilla Island, Fla.
856. Anclote Keys, Fla.
877, 878. Fort McRee Range, Fla.

DAY OR UNLIGHTED BEACONS.

Florida Reef beacons.—These beacons, which were in a dilapidated condition, some of them down altogether, are being repaired or rebuilt, and the work is nearly completed.

Catfish Shoal Point beacon, Florida.—This day beacon was destroyed by a passing vessel on May 24, 1897, and was replaced with a temporary wooden structure.

Outer Beacon, Apalachicola Bay, Florida.—This day beacon was knocked down by a passing vessel, which rendered the piling dangerous to passing vessels. The damage was repaired.

South Florida Reef beacons, Florida.—It was found necessary to entirely reconstruct 3 of the beacons and repair the other 15 beacons more or less extensively. Specifications and plans for the metal work were prepared, and contract for the work was made with the lowest bidder. Up to June 30, 1897, 14 of the beacons were repaired and 3 new ones were constructed. The contractor reported that beacon "C," at Coffins Patches, was so badly bent below the disk as to render its repair impossible. It will be necessary to obtain a few additional pieces of metal work and entirely reconstruct this beacon. All the other beacons on Florida Reefs are now in good order and occupy the same locations they did prior to the repair and reconstruction work.

BUOYAGE.

The buoyage of the district is in good condition. New buoys were established as follows:

One in the channel behind Anclote Keys, to mark the fairway through from the southwest channel to the northwest channel and as a guide to clear the remains of the old pier under water.

One to mark pilots' mooring, Pensacola Bar.

The following-named buoys were discontinued: Buoy No. 7, Middle Ground, Tampa Bay; No. 1, Snead Point Shoal, Manatee River (Tampa Bay); No. 8, Turning Point, Cedar Keys.

Seven buoys went adrift or were sunk, of which four were recovered.

Seventh District.

DEPOTS.

Tortugas Harbor, Fort Jefferson, Gulf of Mexico, Florida.—The buoy shed and blacksmith shop are in good condition. The wharf is gone. During the quarantine season, from May to November, it is not advisable to visit or communicate with this depot, as the light-house tender would thereby be made liable to quarantine by the State health board at all the ports in Florida.

Key West buoy depot and coal shed, Gulf of Mexico, Florida.—Nothing was done during the year toward completing repairs. About half of the buoy shed is sunk below the level of the other half. Nothing was done toward raising it, or driving new piles to support it. Piles were driven and stringers placed on them to support the cisterns. The inspector's old dilapidated building was cleaned out and slightly repaired to fit it for the reception of some of the stores brought from Pensacola.

The following recommendation which was made in the Board's last three annual reports is renewed:

> This depot remains much the same as it was when reported last year. It requires extensive repairs to make it usable and to save the wharf and coal shed from complete destruction. This being a sort of halfway station in this long district, it is a very important point from which to work buoys and to send supplies in both directions, and at which light-house steam tenders can take in a supply of coal to make runs among the reef light-houses and with which to return to the mainland. It is estimated that this wharf and coal shed can be put in proper repair for not exceeding $10,000, and it is recommended that an appropriation of this amount be made therefor.

Egmont Key, entrance to Tampa Bay, Gulf of Mexico, Florida.—The coal and buoy sheds are in good condition. The wharf was rebuilt during the year and is now in good condition. It is recommended that a small supply of coal be kept at this place.

Pensacola, Florida.—The light-house depot and blacksmith shop are in good condition, but the depot is without a wharf. The Navy coal wharf, formerly used by the light-house tender, is destroyed, and the only place where she can lie is in the old stone basin, provided that it is not occupied. This basin is a full quarter of a mile from the buoy platform and storehouse, and the railroad track is impracticable. It will be necessary to keep a number of buoys and their appendages and some supplies at this depot, and there must be some place to clean and paint, as well as to make slight repairs on buoys here, and a wharf is a necessity for effective work. At this depot during the year there were 23 buoys repaired, 38 buoys bushed, 100 shackles repaired, 235 shackles, 370 shackle pins, 1,150 assorted split keys, 122 bushings, and 100 pounds railroad spikes made. All the tools needed by the tender for buoy and other work and patches for the boiler were made here. Many minor repairs were made here to the vessel and her equipment, and 38 buoys were cleaned and painted first coat. Twelve tubular lanterns for beacons and one first-order Funck lamp were repaired. The headquarters of the inspector were changed in May, 1897, from Pensacola Navy-Yard to Key West.

TENDERS.

The Laurel.—This wooden twin-screw steamer was constantly employed at the regular inspection, supply, and buoy work of the district. Her crew scaled, cleaned, and painted 307 buoys, changed 337 buoys, distributed 70 rations, besides extra supplies to the light-stations, and worked 45 days at the light-house depots. She made 159 inspection trips and one special trip with members of the Army Fortification Board. The tender's people bushed 46 buoys and patched 10 buoys while away from the depot blacksmith shop. The vessel was under steam 310 days and fires were hauled 55 days. In performing this duty she steamed about 10,452 nautical miles, and consumed for all purposes some 665 tons of bituminous coal.

The condition of the tender, as reported in former years, is bad. As the new tender *Mangrove* will be ready to relieve her soon, no extensive repairs were made.

New tender for the Seventh and Eighth light-house districts.—By the sundry civil appropriation act approved June 4, 1897, $37,500 was appropriated for finishing the construction of, equipping, and outfitting, complete for service, a new steam tender for buoyage, supply, and inspection in the Seventh and Eighth light-house districts. This vessel, the *Mangrove*, is about ready to be launched.

The Arbutus.—This twin-screw steamer was employed part of the year in this district making repairs at light-stations, inspecting light-house reservations, etc., but the employment being partly in the Seventh and partly in the Eighth district, the report of her operations, such as number of miles steamed, coal used, etc., is given in the statement relative to the Eighth district. The *Arbutus* located and painted the beacons in Apalachicola Bay, St. George Sound, and at Cedar Keys, Florida, and installed the lanterns ready for lighting. She made a trip to the Florida coast to ascertain the damage done by the storm of September 28 and 30, 1896, and repairs were made by her crew at Cedar Keys and Anclote Keys light-stations. Beacons in Apalachicola Bay, St. George Sound, and at Cedar Keys were inspected and no damage noted. In November, 1896, a visit was made to Sanibel Island to inspect and survey the light-house reservation, to locate the northern boundary line. Inspections were also made at Egmont Key, Sanibel Island, and Anclote Keys light-stations. In May, 1897, as the port shaft of the tender was broken, she was docked and a new shaft was provided.

Seventh District.

The Clover.—This schooner assisted in making repairs, etc., at light-stations, such as scaling, scraping, and painting the Florida reef towers, inspecting the South Florida reef beacons, making repairs at Fort Barrancas Range, Fort McRee Range, at Pensacola light-station, Florida, and at Cedar Keys, Florida, and in construction of a temporary beacon at Catfish Shoal Point, Florida. She was docked twice during the year and received a few minor repairs. During the year the schooner sailed about 5,027 miles. She was of the greatest assistance in making repairs at various light-stations in both the Seventh and Eighth light-house districts.

EIGHTH DISTRICT.

This district extends from, but does not include, Perdido Entrance Florida, to the southern boundary of Texas. It embraces all aids t navigation on the Gulf coast of the United States and tidal water tributary to the Gulf between the limits named, together with thos on the Mississippi River below New Orleans, and on Grand Lake an Lake Chicot.

Inspector.—Commander Joseph B. Coghlan, United States Navy, t February 1, 1897; since then Lieut. Commander A. V. Wadhams United States Navy.

Engineer.—Maj. James B. Quinn, Corps of Engineers, United State Army, to May 25, 1897; since then Lieut. Col. A. N. Damrell, Corps o Engineers, United States Army.

In this district there are—

Light-houses and beacon lights, including 27 post lights on the Mississippi River, Grand Lake, and Lake Chicot	9
Light-vessels in position	
Day or unlighted beacons	1
Fog signal operated by steam	
Fog signals operated by clockwork	1
Gas-lighted buoys in position	
Whistling buoys in position	
Bell buoys in position	
Other buoys in position	11
Steamer *Pansy*, buoy tender, and for supply and inspection	
Steamer *Arbutus*, for construction and repair in the Seventh and Eighth districts.	
Tender *Clover*, for construction and repair in the Seventh and Eighth districts.	

LIGHT STATIONS.

884. Sand Island, off Mobile Point, Gulf of Mexico, Alabama.—This station was damaged by a storm which passed over the Gulf in July, 1896, and wrecked the fog-bell tower. The bell was recovered by the tender *Arbutus* from where it was sunk in 5 feet of water. It was found that the island was being washed away by the action of the sea, rendering the position of the tower dangerous, and it was decided to protect the site by placing stone and granite blocks around the foundation. Contract was made to do the work and operations were begun in December, 1896, and were completed April 27, 1897, during which time 1,600 tons of rock were placed. The rock work did not entirely protect the site of the tower and the erosion of the island has continued rapidly, and the situation is now precarious. Authority was secured for the rebuilding of the fog-bell tower which was destroyed by the

8

storm in July, 1896, and it was done by contract, and the tower was completed January 13, 1897. It is a square pyramidal tower painted white. The height of the bell tower is 37 feet and the height of the bell is 33 feet, and the height of the top of the foundation piles of the bell tower is 12 feet, all above mean sea level. The bell is struck by machinery.

The following is an extract from the Board's last annual report:

> For several years past the destruction of this station has been threatened by the encroachment of the sea. The island has been cut away to such an extent that the tower and buildings, which are of masonry, are now entirely surrounded by water. The light is of great importance, since it forms one of the system of coast lights and marks the entrance to Mobile Bay. It is proposed to erect new structures, so designed that if necessary they can be taken down and removed to another safe site should the cutting away of the island continue.
>
> It is estimated that this can be done for $65,000, and it is recommended that an appropriation of this amount be made therefor.

887. Mobile Point, Mobile Bay, Alabama.—A brick oil house was built, the work being begun June 9, 1897, and completed June 12, 1897.

888 to 905, with the exception of 892, 900, and 902. Mobile Ship Channel lights, Alabama.—Contract was made for the erection of 8 square and 7 triangular beacons in Mobile Bay, Alabama. The contractor took charge of the materials on September 24, 1896, and began preparation for the erection of the beacons. Work was continued up to February 13, 1897, but the contractor having shown no disposition to push the work, after being granted an extension of time, and the work which was done by him being very poorly executed, the Board set aside his contract and placed the work in charge of the district engineer, who completed the erection of the beacons March 29, 1897. Three of the lanterns were transferred from the old pile-cluster beacons to the new structures in May, being new beacons Nos. 16, 18, and 20, red lights, the transfer being made by the tender *Arbutus*. Brackets for holding the lanterns were furnished and installed on the new structures, and it is expected that the lights will be transferred from all the old pile clusters at an early date. Considering the method of attending lights, the system has been kept as efficient as possible, but it has been far from satisfactory. All the lights will soon be exhibited from permanent structures recently completed.

906. Horn Island, Mississippi.—A new cistern foundation was built and a new cistern 9 by 10 feet erected. Various repairs were made.

911. Ship Island, near west end of Ship Island, Mississippi.—Some 240 feet of plank walk 6 feet wide was built. Two boat davits were completed. The cistern was raised and a new pipe was put in from the cistern to the house. Various minor repairs were made.

—. *Pearl River, on the east bank of the river, about seven-eighths of a mile below the railroad bridge, Mississippi Sound, Mississippi.*—The following recommendation made in the Board's last three annual reports is renewed:

> An appropriation of $250 was made by the act approved on March 2, 1889, for the establishment of a light at this point. Continuous but unsuccessful effort has been made to obtain title to a site on which a proper structure could be erected. The difficulty is that the owner can not give such a title as the Government can accept. The legal costs of condemning a site would probably exceed the appropriation. The Board therefore recommends that Pearl River be included in the general appropriation for lighting rivers, when under its provisions a site for the light can be leased and the light can then at once be established.

918. Port Pontchartrain, Lake Pontchartrain, Louisiana.—The dwelling was thoroughly repaired and a shed was built from the kitchen to the dwelling. From this shed another was erected at right angles, connecting with the tower. Various repairs were made.

919. Bayou St. John, Lake Pontchartrain, entrance to Bayou St. John, Louisiana.—Some 60 feet of new decking was laid. The wharf was made 2 feet wider on the east end of the house. A fence 7 feet high with a gate in the center was erected across the plank walk at the entrance to the house. The entire structure, 1,700 feet long, was repaired. Two burners were furnished for the illuminating apparatus. Various thorough repairs were made.

924. Chandeleur, Gulf of Mexico, Louisiana.—This tower was completed August 25, 1896. The tower is a skeleton iron structure painted mineral brown from the base to the gallery and the upper parts black. The height of the focal plane above mean sea level is 102 feet. It bears a fixed white light and is a guide to Ship Island and Cat Island anchorages.

931. Southwest Pass, mouth of the Mississippi River, Louisiana.—Plans for the reconstruction and repair of this tower and its dwellings, partially destroyed by fire some years ago, were in course of preparation during the year, and it is hoped the work can soon be begun. Various repairs were made.

935. Cubits Gap light and fog signal, Mississippi River, below New Orleans, Louisiaua.—The keeper is now living in a rented building, which is barely habitable, and is the only one available. A keeper's dwelling seems to be urgently needed. It is estimated that a suitable structure can be erected for not exceeding $2,500, and it is recommended that an appropriation of this amount be made therefor.

953. Barataria Bay, Gulf of Mexico, Louisiana.—The erection of a new frame light tower on the cover face of Fort Livingstone was begun. It consisted of the removal and reconstruction of the old tower. Contract was made and the work was begun on January 6, 1897, and completed in the early part of March. The lantern was lit in the new tower on March 13, 1897, for the first time. The new tower is a square pyramidal frame tower, painted white, with the focal plane 76¼ feet above mean high water. The light is visible 14½ miles. The light is fixed white, of the fourth order.

—. *Oyster Bayou, Gulf of Mexico, Louisiana.* The following recommendation, made in the Board's annual report for 1894, is renewed:

> This bayou opens into the Gulf of Mexico, and is the entrance inland for all small craft engaged in the oyster, fish, and other industries. The vessels, something over 300 in number, supplying the four oyster packers at Morgan City, pass through Oyster Bayou. Vessels frequently attempt to make the bayou at night, and, lacking a light to indicate the entrance, sometimes sail 5 or 6 miles beyond it before discovering their mistake. It is therefore proposed that a light-house be placed here. Oyster Bayou is a recognized inside channel. If vessels did not pass through it, they would have to go around Pointe a Fer and the Southwest Reef light-house to reach Morgan City, thus taking an outside route very dangerous for small vessels. The mouth of the bayou is exposed to the severe storms of the Gulf, which, at times, bank the water up to a height of 6 or 7 feet above the ordinary level and sweep over the place in violent waves. Hence it will be necessary to place the light-house on iron piles in order to raise it above the reach of storm waves. The station should be established on the point formerly occupied by the private light maintained there by certain oyster packers of Morgan City. It should consist of a keeper's dwelling, from the top of which should be shown a white light from a lens lantern. It is estimated that this could be built at a cost not to exceed $5,000. Recommendation is made that an appropriation of this amount be made therefor.

955. *Ship Shoal, Gulf of Mexico, Louisiana.*—The rust was removed from the tower from top to bottom, after which two coats of paint were applied. The station was put in good repair.

956. *Southwest Reef, entrance to Atchafalaya Bay, Gulf of Mexico, Louisiana.*—Repairs were begun on January 20, 1897, and were completed March 5, 1897. They consisted among other things of the construction of a platform 20 by 20 feet, putting down 3 mud ladders, placing 4 I beams under the tower, and bolting to the tower foundation beams. The gallery around the tower, 4 feet wide and 60 feet long, was renewed, a trapdoor and an iron ladder leading from the trapdoor to the platform were placed. An iron railing around the gallery was replaced. A new floor was placed in the bottom of the tower and a new ceiling around the inside of the tower, bottom story 8 feet high and 80 feet around. A new oil room was built and its floor was covered with sheet lead. Four new doors and door frames were made and put in. Two new boat winches were erected and tackle was put up for the boat. The tower was calked throughout where necessary and painted from top to bottom on the outside. A new trapdoor was made for the bell tower. A new closet was constructed. All new work received two good coats of paint, and the station was left in good order.

—. *Mermenteau River light-station, near the mouth of the Mermenteau River, Gulf of Mexico, Louisiana.*—The following statement, made in several previous annual reports of the Board, is repeated:

> The establishment of a light here, at a cost not to exceed $7,000, was authorized by the act approved February 15, 1893, but no appropriation therefor has yet been made. The Board again recommends that the amount named be appropriated.

Eighth District.

969. Galveston Jetty, Galveston Bay, Texas.—Nothing was done under this appropriation beyond the consideration of the form and location of the structure best suited to the locality.

978.—Red Fish Bar light-station, Texas.—The boat landing was renewed. Various repairs were made.

The following recommendation, made in the Board's last two annual reports, is renewed:

> This light is almost useless as an aid to navigation in its present location. A light upon the edge of the channel which has been cut through Red Fish Bar would be of much service. The buildings of the station have decayed to such an extent that it is impracticable to remove them and place them elsewhere. It is estimated that to reestablish this light on the edge of the channel, where it would be of great use to vessels going through the cut, would cost, say, $8,000, and it is recommended that an appropriation of this amount be made therefor.

980. Brazos River, Gulf of Mexico, Texas.—The contracts for the construction of this light-house and for furnishing the metal work were made. The metal work was completed and shipped December 30, 1896, and the construction work was completed March 25, 1897.

—. *Reimbursement of light-keepers for losses sustained during the hurricane of October 1, 1893.*—The following recommendation, which was made in the Board's last three annual reports, is renewed:

> Statements of these losses, to the amount of $2,603.62, approved and recommended by the inspector of the Eighth light-house district, were sent by the Secretary of the Treasury to the Speaker of the House of Representatives in his letters of March 7 and April 3, 1894, with recommendation that reimbursement be made. The Board recommends that an appropriation of this amount be made therefor.

REPAIRS.

At each of the following named stations repairs more or less extensive were made during the year:

907. Round Island, Miss.
910. East Pascagoula, Miss.
912. Biloxi, Miss.
921. Chefuncte River, La.
924. Chandeleur, La.
925. Pass a Loutre, La.
929. South Pass beacon (front), La.
968. Sabine Pass, La.
974. Bolivar Point, Tex.
977. Halfmoon Shoal, Tex.

LIGHT-VESSELS.

926. South Pass light-vessel, No. 43, moored in 82 feet of water off the South Pass entrance to the Mississippi River, Louisiana.—This vessel was on her station from November 9, 1896, to May 26, 1897. On the latter date she was towed in and moored alongside the depot wharf. The light and steam fog signal are in good order and were very beneficial to navigation, as the past winter was quite severe and an unusually foggy season.

973. Galveston light-vessel, No. 28, inside of Galveston Bar, Gulf of Mexico, Texas.—This vessel may soon have to be hauled out and examined, when new copper and some planking may have to be put on her hull. Slight repairs were made to the roof over the quarter-deck.

Eighth District.

DAY OR UNLIGHTED BEACONS.

The beacons are in fair condition.

FOG SIGNALS OPERATED BY STEAM OR HOT-AIR ENGINES.

926. South Pass light-vessel, No. 43, Louisiana.—The 12-inch steam whistle was in operation about 724 hours and consumed about 30 tons of anthracite coal.

BUOYAGE.

The buoyage of the district was looked after by the tender. Requisitions were made for a further supply of spare buoys, sinkers, chain, etc., as the stock on hand is in a depleted condition. During the year the following-named buoys were discontinued: Two in Atchafalaya Bay; Wreck of Bark Bruce Buoy at Ship Island, Mississippi; north buoy at Chandeleur Island, Louisiana; Head of the Passes, Mississippi River, Louisiana, buoy. The following-named were established: Wreck buoy on Tiger Shoals, and a whistling buoy was placed at Trinity Shoal to replace the first-class nun buoy. This buoy, which was placed as an experiment, has proved to be a better aid to navigation. A bell buoy was placed, instead of the second-class nun, known as Knoll buoy, at the entrance to the Main Ship Channel into Mobile Bay. This buoy was placed as an experiment, and has proved to be a better aid than the nun buoy. Four buoys were placed to mark the channel between the jetties at Galveston entrance. Four buoys were placed in the South Pass, Mississippi River, Louisiana.

DEPOT.

Port Eads, Louisiana.—The depot buildings are in fair condition.

TENDERS.

The Pansy.—This twin-screw steamer cared for the buoys, delivered fuel, provisions, and supplies to the light-houses and light-vessels, and conveyed the Inspector on his regular visits of inspection. Annual supplies were delivered by the tender to lights in Lake Borgne and Pontchartrain. During the year the vessel was docked and her bottom scraped and painted. New cast-steel propellers, of the same diameter as the old ones, with detachable blades, were furnished and proved satisfactory. An armature for the dynamo was sent to New York and rewound. Some 13 days were spent by the crew in cleaning and overhauling the buoys and their appendages. She replaced 24, placed 13, recovered 10, changed 40, and cleaned and painted 110 buoys. She also erected 6 and painted 10 post lights on the Mississippi River below New Orleans. She steamed about 8,459 miles and consumed some 513 tons of coal.

Eighth District.

The Arbutus.—This twin-screw steamer was actively engaged in connection with the repairs, inspections, etc., of light stations. She was docked and repaired in July. The crew made a new set of sails, a new boat cover, new masts and booms for the boat, and repaired her. They also scraped and cemented the water tanks, repaired the rigging and mainsail of the tender. In the engine room the bilges were pumped out, the bright work of the machinery was cleaned and tallowed, the tubes and sheet of fresh-water evaporator were taken out and the inside scraped and cleaned. The main deck and saloon deck were calked, the paint burned off the cabin and the house, and the main rail was repaired. The port shaft of the tender was broken in Mobile Bay while transferring the lanterns from the old pile clusters to the new structures, and the tender went on dock and had the shaft removed, when it was found that a new one would be necessary. This was ordered, and before its arrival the tender took on board the materials and workmen and proceeded to Mobile Point light-station, and built the oil house at this station. Inspections were made at the following-named light stations: Sand Island, Alabama; Chandeleur, Louisiana; South Pass, East Jetty, Louisiana; South Pass, Louisiana; Barataria Bay, Louisiana; Southwest Reef, Louisiana; Ship Shoal, Louisiana; Brazos River, Texas; Aransas Pass, Texas; Red Fish Bar, Texas. The tender was under repair from December 8, 1896, until February 27, 1897. She was docked and repairs were made to hull and propellers. The old water-tube boiler was removed and a new boiler was installed. A new air pump was installed and all the connections made. The new boiler has given satisfaction. With the old water-tube boiler it was found that an average of 15½ miles per ton of coal consumed was made by the tender, whereas an average of 24 miles per ton was made with the new boiler. The tender traveled about 11,096 miles and consumed some 639 tons of coal during the year.

The Clover.—This tender assisted in repair work at the light stations. She delivered materials and the working party at Biloxi light-station, Round Island light-station, Horn Island light-station, and Southwest Reef light-station. The following-named beacons in Mobile Bay were repaired during the year: Nos. 5, 9, and 49, old pile-cluster beacons and beacon No. 27, and the Sixth Bend beacon, Dog River Bar Range.

New tender for the Seventh and Eighth light-house districts.—By the act approved on June 4, 1897, $37,500 was appropriated for finishing the construction of, equipping, and outfitting, complete for service, a new steam tender for buoyage, supply, and inspection in the Seventh and Eighth light-house districts. It is expected that she will be put into commission in the course of this calendar year.

NINTH DISTRICT.

This district includes all aids to navigation on Lake Michigan, Green Bay, and tributary waters lying west of a line drawn across the Straits of Mackinac just east of Old Mackinac Point light-station, Michigan.

Inspector.—Commander James H. Dayton, United States Navy, to May 1, 1897; since then Commander E. H. C. Leutze, United States Navy.

Engineer.—Maj. Milton B. Adams, Corps of Engineers, United States Army.

There are in this district—

Light-houses and beacon lights	102
Light-vessels in position	4
Fog signals operated by steam	30
Fog signals operated by clockwork	7
Buoys in position	101
Gas-lighted buoys	4
Steamer *Dahlia*, buoy tender, and for supply and inspection	1
Steamer *Amaranth*, engineer's tender, for repairs and construction	1
Steamer *Warrington*, engineer's tender, for repairs and construction	1
Steam launch *Lotus*, for construction and repair	1

NOTE.—The number preceding the name of a light-station in the Ninth, Tenth, Eleventh districts, and that portion of the Third district on Whitehall Narrows, and the United States waters of Lakes Champlain and Memphremagog, is that by which it is designated in the List of Lights and Fog Signals of the United States on the Northern Lakes and Rivers, corrected to the opening of navigation, 1896.

LIGHT-STATIONS.

1471. McGulpin Point, Straits of Mackinac, Michigan.—Some 3,500 brick, with cut stone and cement, were purchased for the erection of an oil house. The illuminating apparatus was repaired.

1476. Waugoshance, Lake Michigan, Michigan.—The construction of the concrete protecting pier was continued during July. In August some 269 running feet of the sea wall was built, and about one-third of interior concrete floor laid, except the finishing coat. All the work of constructing concrete protection was completed, and the work closed on October 10, 1896. Various repairs were made to the keeper's dwelling.

1477. Skilligallee, Lake Michigan, Michigan.—The boilers and engines of the fog-signal plant were thoroughly repaired. Some 60 feet of pier extension 8 feet wide and 7½ feet high, were built. The boatways were extended 35 feet, and various repairs were made to the keeper's dwelling.

Ninth District.

1482. South Fox Island, Lake Michigan, Michigan.—The material required for extending the water supply crib, as well as for rebuilding the boathouse, was ordered and delivered by the light-house tender *Amaranth.* Various repairs were made.

1483. Grand Traverse, Lake Michigan, Michigan.—A sidewalk 75 feet long and 3 feet wide was laid. Various repairs were made.

The following recommendation made in the Board's last two annual reports is renewed:

> The establishment of a fog signal here is deemed necessary to navigation. It is estimated that it will cost not exceeding $5,500, and it is recommended that an appropriation of this amount be made therefor.

1484. Mission Point, Lake Michigan, Michigan.—The metal work required for an oil house was ordered.

1485. North Manitou, Lake Michigan, Michigan.—Contracts for the construction of a keeper's double dwelling and a fog-signal house were made. Operations were begun in August, and in October, 1896, the fog-signal building was completed, with the exception of the plastering and ceiling overhead. The fog-signal boilers and machinery were completed under contract and inspected and delivered at the station in October, 1896, by the light-house tender *Amaranth.* Both boilers and stacks were set up, a tank stand built and the tank placed thereon, the north engine was set and piped to the boiler tank, well, and hand pump, and a well was sunk. The north signal was finished, ready for service. The signal was put in operation on November 20, 1896. During November the dwelling was completed. The fences and sidewalks were built and the oil house was finished. The work under contract was all completed in December, 1896. Various repairs were made. Plans for a cylindrical steel tower are in course of preparation.

1486. South Manitou, Lake Michigan, Michigan.—Material for constructing 1,400 running feet of sidewalk between the dwelling and boathouse was purchased. The fog-signal boilers and machinery under contract were completed and inspected and delivered at the Detroit light-house depot in September, 1896, and delivered at the station by the light-house tender *Amaranth.* The materials for fireproofing the signal house were purchased and delivered at the station by the light-house tender *Amaranth.* All the signal machinery was renovated, and the new boilers were placed on brick foundations in signal house No. 1. Engine No. 1 was refitted and set up and tested. New sills were put under building No. 2, the machinery removed, and the building was removed to the rear of signal No. 1. Various repairs were made.

1487. Point Betsey, Lake Michigan, Michigan.—Storm houses were constructed at the entrance to the tower, the southwest entrance to the dwelling, and at the kitchen entrance, and the hinges of the lantern door were repaired. Various repairs were made.

1488. Frankfort Pierhead, Lake Michigan, Michigan.—The light tower and fog-bell tower were moved to the outer end of the south pier on

November 16, 1896; new foundations were built, and the towers were placed and firmly bolted down. Some 600 running feet of elevated walk was built. A rear range light was established on January 22, 1897, in the center of the elevated walk, about 600 feet in rear of the pierhead beacon, and the elevated walk was widened at that point.

1489, 1490. Portage Lake Pierhead Range, Lake Michigan, Michigan.—The following recommendation, made in the Board's last annual report, is renewed:

> This station consists of two lights on the Government pier, but there is no dwelling here for the keeper. It is estimated that an appropriate structure can be erected for $3,500, and it is recommended that an appropriation of this amount be made therefor.

1491. Manistee Pierhead, Lake Michigan, Michigan.—The elevated walk was rebuilt. A parabolic sound deflector for the fog signal was constructed.

1492. Manistee, Lake Michigan, Michigan.—A Rumsey double-break pump, with hose and nozzle, were purchased for fire protection.

1496. Ludington Pierhead Range, Lake Michigan, Michigan.—A parabolic sound deflector for the fog signal was constructed, and whistle-pipe connections were made with both boilers. The carbureter well of the gas machine was rebuilt. Various repairs were made. The establishment of a keeper's dwelling was authorized by the act approved February 15, 1893, at a cost not to exceed $4,500, but no appropriation has yet been made. It is recommended that an appropriation of $4,500 be made for this purpose.

1513. St. Joseph Pierhead Range Front, Lake Michigan, Michigan.—A red globe, for use in the conduit light, was shipped to the keeper. This light was discontinued November 16, 1896, the elevated conduit was taken down, and the beacon was moved to the end of the pier.

1514. St. Joseph Pierhead Range, Lake Michigan, Michigan.—The boat-house was damaged by the barge *Eva Robinson* and the keeper was authorized to have it repaired. Some 230 feet of elevated walk was erected and extended to the inner end of the fog-signal house. Plans and estimate of cost for establishing a fog-signal station on the north pier were made, and the material needed was purchased and delivered at the station. The fog-signal boilers and machinery were purchased under contract. During November, 1896, the substructure of the fog-signal house was completed, the building raised, and nearly all the outside wall sheathing put on. A well was provided in the crib by removing all the stone from one pocket and placing therein a plank box and replacing the stone. The building was completed in January, 1897, planking was put on the outside of all the large doors to a height of 3½ feet to protect them from the sea, the boilers and machinery were moved into the signal house, placed and leveled, all pipe connections were made between the boilers, engines, pumps, whistle, tank, and the whole plant was tested under steam pressure and found satisfactory. A parabolic sound deflector was constructed over the whistle. The 10-inch steam fog whistle was established on the north pier on February 1, the old fog bell was discontinued, and the machinery and striking apparatus were taken down; the bell and clockwork were boxed for shipment and stored in the lower room of the beacon.

1516. Michigan City, Lake Michigan, Indiana.—The following recommendation, made in a previous annual report of the Board, is renewed:

> The Board is of opinion that a fog signal, operated by steam or hot air, at this station would be a valuable aid to navigation. It is estimated that it could be established for a sum not to exceed $5,500, and it is recommended that an appropriation of that amount be made therefor.

1531. Wind Point, Lake Michigan, Wisconsin.—A new water table was placed around both signal houses, the two lower courses of siding were renewed, and the roofs were painted. A locomotive headlight with parabolic reflector was substituted for the sixth-order lens covering Racine Reef. Many important repairs were made.

—. *South Milwaukee, Lake Michigan, Wisconsin.*—The following statement made in the Board's last four annual reports is repeated:

> Recommendation was made through the proper channel to Congress in February, 1893, for the establishment of a light at this place. South Milwaukee is a village about 10 miles south of the city of Milwaukee. It is a thriving manufacturing place of some 1,200 inhabitants. There is a large business done here in building materials. It is claimed that it will double its population within a year. The Board is of the opinion that a light should be established on the north pier of the harbor. It is estimated that it will cost, say, $7,500, and it is recommended that an appropriation of this sum be made.

1532. Milwaukee Pierhead, Lake Michigan, Wisconsin.—Two new improved fog-signal boilers were substituted for the old worn-out upright boilers. Many and important repairs were made.

1533. Milwaukee, Lake Michigan, Wisconsin.—The illuminating apparatus was altered on May 12, 1897, to produce a flash every 30 seconds instead of every 45 seconds. The foundation walls were laid and the material framed and raised for the addition to the keeper's dwelling, and the sheathing and cornice were put on. A new foundation was built for the oil house and the building was moved and placed thereon. A furnace was put into the dwelling. Various repairs were made.

1542, 1543. Kewaunee Pierhead Range, Lake Michigan, Wisconsin.—The elevated walk damaged by the schooner *Elida* was repaired. A sound deflector was erected over the whistle, and the piping of the whistles was changed to suit. Minor repairs were made.

The following recommendation made in the Board's last annual report is renewed:

> This station, which consists at present of range lights and a steam fog signal, has no dwelling for the keepers. It is estimated that proper structures can be erected for $7,500, and it is recommended that an appropriation of this amount be made therefor.

Ninth District.

1545. Ahnapee Pierhead Range (*rear*), *Lake Michigan, Wisconsin.*—An elevated walk 400 feet long was built. Minor repairs were made.

1547. Sturgeon Bay Canal, Lake Michigan, Wisconsin.—Borings were made to a depth of 49 feet, and the nature of the underlying materials was ascertained. Plans for a cylindrical steel tower are in course of preparation.

1549. Sturgeon Bay Canal Northwest Entrance, No. 2, Lake Michigan, Wisconsin.—A cluster of 6 piles 30 feet long and 12 inches through was built for this light, and a superstructure was erected on the cluster.

1550. Sturgeon Bay Canal Northwest Entrance to Cut No. 3, Lake Michigan, Wisconsin.—A more permanent structure was built. It consists of a crib on a foundation of riprap. The upper portion of the crib has sloping sides and is surmounted by a lamp house with the light on top.

1551. Bailey Harbor Range (*front*), *Lake Michigan, Wisconsin.*—A new fifth-order tubular burner with a parabolic reflector was substituted for the steamer lens.

1553. Cana Island, Lake Michigan, Wisconsin.—The boatways were rebuilt and provided with new rollers. The barn was rebuilt. The well was deepened 28 feet, making its total depth 50 feet below lake level. Various repairs were made.

1555, 1556. Plum Island Range, Lake Michigan, Wisconsin.—Range lights and a steam fog signal were established here on May 1, 1897. The material for construction was delivered by the light-house tender *Amaranth*, and the work of construction was begun. About 1½ acres were cleared for a camp and range sites, and a strip 20 feet wide and 1,600 feet long was cleared between the proposed sites for ranges. In August the barn and boathouse were built, a landing dock 96 feet long was built into 3 feet of water at the outer end, boatways were framed, ready to set, and a tramway track was laid, 367 feet long. A hoisting engine was set up, a roadway was cleared to the site of the fog-signal house at the western end of the island. The space for the fog-signal house was cleared, a water supply dock 210 feet long was built into 4 feet of water at the outer end. Some 82,000 brick and 36 cubic yards of sand were hauled to the site of the buildings. The center concrete pier of the rear iron tower was put in, a cellar for the dwelling was excavated, brick walls were started and carried to the grade line on the northwest and southwest sides, and excavations were made for the front tower. During September the front range tower was erected complete, except the iron roof, and given one coat of paint. The trees were cleared from 3 acres of land. In October steam sirens for the fog-signal plant were purchased and the fog-signal boilers were delivered at the station. The erection of the rear tower was completed. The brickwork of the dwelling was completed and the roof was put on. A brick oil house was erected. Grading was done around the dwelling, the fog-signal building was erected. During November some 300 feet of sidewalk was laid. A space 200 feet square was cleared and graded around the dwelling. Some 350 feet of track was laid from the dock to the fog signal. The engines were set up and piped, injectors, engine pumps, and water tank were piped. The boilers were washed out three times with soda, and the covering for boiler No. 1 was put on. All work at this station was completed December 4, 1896. Some 1,277 feet of walk was laid between the rear range and the fog signal.

——. *St. Martin Island, St. Martin Passage, between St. Martin and Little Gull islands, entrance into Green Bay, Lake Michigan, Michigan.*—The following statement, made in several previous annual reports of the Board is repeated:

> The establishment of a fourth-order light and a fog signal here, at a cost not to exceed $15,000, was authorized by the act approved February 15, 1893, but no appropriation therefor has yet been made. The Board recommends that the amount named be appropriated.

——. *Pointe aux Barques (Manistique), Lake Michigan, Michigan.*—The following recommendation, which was made in the Board's annual report for 1892, is renewed:

> The establishment of the Lake Michigan light and fog-signal vessels, Squaw Island light and fog signal, Seul Choix Pointe light, and the additional buoyage authorized in the northern part of Lake Michigan has made those waters reasonably safe for navigation on the route from the Straits of Mackinac to Green Bay ports, with the exception of a stretch of 45 miles between Seul Choix Pointe and Poverty Island. Pointe aux Barques is a prominent headland 24½ miles northeast one-half north from Poverty Island light, and 23 miles west-southwest from Seul Choix Pointe light. Poverty Island light is visible 16¾ miles and Seul Choix Pointe is visible 15 miles. There is, therefore, a space of 13¾ miles off Pointe aux Barques not covered by any light. The town of Manistique, situated at the mouth of Manistique River, at the head of the bay between Seul Choix and Pointe aux Barques, has a large lumber trade and many vessels call at that port. The route north of the Beavers and along the coast down to Poverty Island passage into Green Bay is the usual route of the ore vessels to and from Lake Erie ports in northwest winds, and the shipments of ore this year from Escanaba are largely in excess, it is said, of those of any port in the world. The Board recommends that a coast light and fog signal be established on Pointe aux Barques, Lake Michigan, Michigan. It is estimated that this can be done for a sum not to exceed $32,000, and it is recommended that an appropriation of this amount be made therefor.

——. *Fisherman Shoal, Lake Michigan, Wisconsin.*—The following recommendation, made in the Board's last annual report, is renewed:

> This shoal rock, which is near Rock Island, forms a dangerous obstruction to the increasing number of vessels passing in this vicinity. It is proposed to establish a light and fog signal on this shoal in the interest of this commerce. It is estimated that it can be done for $50,000, and it is recommended that an appropriation of this amount be made therefor.

1563. Escanaba, on Sand Point, Green Bay, Michigan.—The following is an extract from several previous annual reports of the Board:

> A steam signal here is not essential, as the navigation of Little Bay de Noquette is quite unobstructed, and with a steam whistle on Eleven-Foot Shoal a vessel should

> be able to reach the point with reasonable safety. A fog bell struck by machinery in the light-station at Escanaba, on Sand Point, would be a valuable addition to the service of this station.

It is estimated that a fog signal can be established here for not exceeding $5,000. Recommendation is therefore made that an appropriation of this amount be made therefor.

1564. Squaw Point, Green Bay, Lake Michigan, Michigan.—Plans, specifications, and detailed estimate of cost and contract for constructing a light tower, keeper's dwelling, boathouse, etc., were made. The work was begun in May, 1897. The tower, dwelling, etc., were about one-half completed at the close of the fiscal year.

NOTE.—The light was established on August 16, 1897.

1569. Chambers Island, Lake Michigan, Wisconsin.—The boathouse was moved 75 feet nearer the lake and rebuilt, new boatways were constructed, and the old cribs, which originally constituted the dock, were removed and the stone was used for filling and riprapping the new work. A wire fence 1,600 long was put up inclosing the reservation. A wood shed was built, a new sidewalk was laid to the wood shed. A drive well was sunk and a plentiful supply of pure water was obtained. A platform and a sidewalk to the dwelling were built. Various repairs were made.

1570. Menominee Pierhead, Green Bay, Michigan.—Contract was made for furnishing the boilers, machinery, etc., for duplicate steam fog signals. They were delivered to the station by the light-house tender *Amaranth*. The fog-signal building was framed and erected on a timber substructure. The boilers and machinery were placed in the building. Some 208 running feet of elevated walk was rebuilt. Various repairs were made.

NOTE.—The fog signal was established on September 4, 1897.

1571. Green Island, Green Bay, Wisconsin.—A brick oil house was erected. The building used as a summer kitchen and woodshed was rebuilt, and the shed adjoining the dwelling was fitted for a stable or workshop. The south pier of the boat harbor was extended 50 feet; the north pier was rebuilt and extended 10 feet, and the boatways were reconstructed and extended 40 feet. A drive well was sunk, a plentiful supply of good water was obtained, and an antifreezing force pump was provided. Various repairs were made.

1575. Tail Point, Green Bay, Wisconsin.—The following recommendation made in the Board's annual report for 1894 is again renewed:

> The fog bell at this station is of little or no benefit in its present location, it being so far from the channel that it can be heard only in the stillest weather, and not then if the wind is from the northward or eastward. Interested navigators urge that not only should the bell be moved, but also that the light should be moved to the spot now marked by the red can buoy, which is S. by E. ¼ E. 1,650 yards distant from the present light. A crib of sufficient size can be built in say 10 feet

of water, and the present light-keeper's dwelling and tower can be moved to it, and the fog bell established on it, at a cost which is estimated to be not exceeding $7,500. It is therefore recommended that an appropriation of this amount be made therefor.

REPAIRS.

During the fiscal year repairs more or less extensive were made at each of the following-named stations:

1470. Old Mackinac Point, Mich.
1478. Beaver Island Harbor, Mich.
1479. Beaver Island, Mich.
1480. Little Traverse, Mich.
1481. Charlevoix Pierhead, Mich.
1490. Portage Lake Pierhead Range, Mich.
1494. Ludington North Pierhead, Mich.
1499. Petite Point, Au Sable, Mich.
1500. White River Pierhead, Mich.
1503. Muskegon Pierhead Range, Mich.
1506. Grand Haven Pierhead, Mich.
1511. Kalamazoo, Mich.
1512. South Haven Pierhead, Mich.
1515. St. Joseph, Mich.
1516. Michigan City, Ind.
1517. Calumet Pierhead, Ill.
1518. Chicago Breakwater, south, Ill.
1521. Chicago Pierhead Range, Ill.
1522. Chicago Harbor, Ill.
1524. Grossepoint, Ill.
1526. Kenosha, Wis.
1528. Kenosha Pierhead Range, rear, Wis.
1529. Racine Pierhead, Wis.
1530. Racine, Wis.
1536. Sheboygan Pierhead, Wis.
1539. Manitowoc Pierhead, Wis.
1540. Two Rivers Pierhead, Wis.
1541. Twin River Point, Wis.
1546. Sturgeon Bay Canal Pierhead, Wis.
1552. Bailey Harbor Range, rear, Wis.
1554. Porte des Morts (Pilot Island), Wis.
1557. Pottawatomie, Wis.
1558. Poverty Island, Mich.
1559. Seul Choix Pointe, Mich.
1560. Squaw Island, Mich.
1561. Point Peninsula, Mich.
1563. Escanaba, Mich.
1565. Cedar River, Mich.
1568. Eagle Bluff, Wis.
1572. Sherwood Point, Wis.
1573. Dunlap Reef Range, front, Wis.
1574. Dunlap Reef Range, rear, Wis.
1575. Tail Point, Wis.
1576. Grassy Island, lower, Wis.

LIGHT VESSELS.

1473. Simmons Reef light-vessel, No. 55, Lake Michigan, Michigan.—This vessel left her station on December 12, 1896, and went to Cheboygan, Mich., for the winter. While there her boiler platforms were renewed and she was supplied with fuel. She is in excellent condition. She returned to her moorings on April 21, 1897.

1474. White Shoal light-vessel, No. 56, Lake Michigan, Michigan.—This vessel left her station on December 12, 1896, and went to Cheboygan, Mich., for the winter. While there her boiler platforms were renewed and she was supplied with fuel. She is in excellent condition. She returned to her station on April 21, 1897.

1475. Grays Reef light-vessel, No. 57, Lake Michigan, Michigan.—This vessel left her station on December 12, 1896, and went to Cheboygan, Mich., for the winter. While there her boiler platforms were renewed and she was supplied with fuel. She is in excellent condition. She returned to her station on April 21, 1897.

Ninth District.

1562. Eleven-Foot Shoal light-vessel, No. 60, about midway between Eleven-Foot Shoal and Corona Shoal, Green Bay, Lake Michigan, Michigan.—This vessel left her station on December 6, 1896, and went to Escanaba, Mich., where she remained for the winter. While in winter quarters she was supplied with fuel. She is in excellent condition and has needed no repairs. She returned to her station on April 17, 1897.

FOG-SIGNALS OPERATED BY STEAM OR HOT-AIR ENGINES.

1470. Old Mackinac Point, Michigan.—The 10-inch steam whistle, in duplicate, was in operation some 413 hours, and consumed about 53 cords of wood.

1473. Simmons Reef light-vessel, No. 55, Michigan.—This 6-inch steam whistle was in operation some 261 hours, and consumed about 13 tons of coal and 2½ cords of wood.

1474. White Shoal light-vessel, No. 56, Michigan.—The 6-inch steam whistle was in operation some 246 hours, and consumed about 10 tons of coal and 2 cords of wood.

1475. Grays Reef light-vessel, No. 57, Michigan.—The 6-inch steam whistle was in operation some 247 hours, and consumed about 10 tons of coal and 1 cord of wood.

1476. Waugoshance, Michigan.—The 10-inch steam whistle, in duplicate, was in operation some 200 hours, and consumed about 15 tons of coal.

1477. Skilligallee, Michigan.—The 10-inch steam whistle, in duplicate, was in operation some 204 hours, and consumed about 3 tons of coal and 18 cords of wood.

1479. Beaver Island, Michigan.—The first-class steam sirens, in duplicate, were in operation some 98 hours, and consumed about 16 cords of wood.

1482. South Fox Island, Michigan.—The 10-inch steam whistle, in duplicate, was in operation some 225 hours, and consumed about 1 ton of coal and 26 cords of wood.

1485. North Manitou, Michigan.—This 10-inch steam whistle, in duplicate, established November 20, 1896, was in operation some 234 hours, and consumed about 6 tons of coal and 19 cords of wood.

1486. South Manitou, Michigan.—This 10-inch steam whistle, in duplicate, was in operation some 738 hours, and consumed about 56 cords of wood.

1487. Point Betsey, Michigan.—The 10-inch steam whistle, in duplicate, was in operation some 515 hours, and consumed about 49 cords of wood.

1491. Manistee Pierhead, Michigan.—This 10-inch steam whistle, in duplicate, was in operation some 572 hours, and consumed about 52 tons of coal and 3 cords of wood.

Ninth District.

1496. Ludington Pierhead, Ludington, Michigan.—This 10-inch steam whistle was in operation some 563 hours, and consumed about 57 tons of coal and 7 cords of wood.

1506. Grand Haven Pierhead, Michigan.—The first-class steam siren, in duplicate, was in operation some 340 hours, and consumed about 29 tons of coal and 2 cords of wood.

1514. St. Joseph Pierhead, Michigan.—This 10-inch steam whistle, in duplicate, established February 1, 1897, was in operation some 217 hours, and consumed about 15 tons of coal and 3 cords of wood.

1522. Chicago Harbor, Illinois.—The 10-inch steam whistle, in duplicate, was in operation some 472 hours, and consumed about 64 tons of coal and 8 cords of wood.

1524. Grossepoint, Evanston, Illinois.—This 10-inch steam whistle, in duplicate, was in operation some 266 hours, and consumed about 23 tons of coal and 2 cords of wood.

1531. Wind Point, Wisconsin.—This 10-inch steam whistle, in duplicate, was in operation some 618 hours, and consumed about 44 tons of coal and 2 cords of wood.

1532. Milwaukee Pierhead, Wisconsin.—This 10-inch steam whistle, in duplicate, was in operation some 716 hours, and consumed about 24 tons of coal and 3 cords of wood.

1536. Sheboygan Pierhead, Wisconsin.—This 10-inch steam whistle, in duplicate, was in operation some 355 hours, and consumed about 34 tons of coal and 1 cord of wood.

1538. Manitowoc Breakwater, Wisconsin.—This 10-inch steam whistle, in duplicate, was in operation some 565 hours, and consumed about 42 tons of coal and 4 cords of wood.

1541. Twin River Point, Wisconsin.—The 10-inch steam whistle, in duplicate, was in operation some 495 hours, and consumed about 37 tons of coal and 3 cords of wood.

1543. Kewaunee Pierhead, Wisconsin.—The 10-inch steam whistle was in operation some 535 hours, and consumed about 41 tons of coal and 2 cords of wood.

1546. Sturgeon Bay Canal Pierhead, Wisconsin.—This 10-inch steam whistle, in duplicate, was in operation some 567 hours, and consumed about 56 tons of coal and 3 cords of wood.

1554. Porte des Morts, Wisconsin.—This 10-inch steam whistle, in duplicate, was in operation some 348 hours, and consumed about one-half ton of coal and 32 cords of wood.

1556. Plum Island, Wisconsin.—This first-class steam siren, in duplicate, established on May 1, 1897, was in operation some 175 hours, and consumed about 11 cords of wood.

1558. Poverty Island, Michigan.—This 10-inch steam whistle, in duplicate, was in operation some 267 hours, and consumed about 1 ton of coal and 33 cords of wood.

Ninth District.

1559. Seul Choix Pointe, Michigan.—This 10-inch steam whistle, in duplicate, was in operation some 214 hours, and consumed about 18 tons of coal.

1560. Squaw Island, Michigan.—The 10-inch steam whistle, in duplicate, was in operation some 334 hours, and consumed about 21 tons of coal.

1562. Eleven-Foot Shoal light vessel, No. 60, Michigan.—The 6-inch steam whistle was in operation some 353 hours, and consumed about 20 tons of coal and 3 cords of wood.

BUOYAGE.

The buoyage of the district is in excellent condition and is attended to by the light-house tender *Dahlia*, except Bank Point buoy, Muskegon Lake, which is done by contract; buoy at St. Joseph Harbor, Mich., which is cared for by the custodian of the light-house depot, and the buoys in Green Bay, south of Long Tail Point, Point and Channel buoys in Fox River, which are attended to by contract.

Middle Shoal Buoy.—A 27-foot spar buoy, red and black horizontal stripes, in 18 feet of water, northern end of Lake Michigan, Michigan, was established October 23, 1896.

Canal Shoal Buoy, Wisconsin.—A second-class red nun buoy, in 25 feet of water, on the eastern extremity of a shoal to the southward of the entrance to Sturgeon Bay Canal, Lake Michigan, was established May 10, 1897.

Outer Shoal Automatic Bell Buoy.—Color changed from red to black April 27, 1897.

Waverly Shoal Buoy, Porte des Morts Passage, Wisconsin.—A black second-class can buoy, in 20 feet of water, on the northeastern extremity of a small shoal about 700 yards to the northward of Nine-Foot Shoal buoy, Lake Michigan, was established August 12, 1896.

Wiggins Point Shoal Buoy, Michigan.—A second-class red nun buoy, in 30 feet of water, marking the eastern extremity of a shoal off Wiggins Point, Upper Peninsula, Lake Michigan, was established June 13, 1897.

Menekaunee Shoal Buoy.—A second-class red nun buoy was established April 25 on the eastern edge of Menekaunee Shoal, south of the entrance to Menominee River, to mark the channel between Green Island and the western shore of Green Bay. The buoy is in 28 feet of water.

Green Island Shoal Buoy.—A 30-foot black spar buoy was established on April 25 on the western point of the shoal, extending from the west point of Green Island, in Green Bay. The buoy is in 18 feet of water.

Second Buoy, Straight Channel, Fox River and Green Bay Channel, Wisconsin.—An 18-foot black spar buoy, in 14 feet of water, on the east side of Straight Channel, about 500 yards from Entrance Buoy, Green Bay, was established July 25, 1896.

Ninth District.

DEPOTS.

St. Joseph, Michigan.—All supplies received from the General Light-House Depot and all blanks and stationery were packed and issued from this depot to the tender for distribution. It was furnished with a gasoline launch. The custodian has planted nearly 100 shade trees and shrubs and has started as much of a lawn as the limited water supply will admit. This work is a necessity, on account of the sandy soil. The buildings are in fair condition. The hot-water tank was connected with the furnace and storm shutters were provided for the front porch of the dwelling. Ten cubic yards of stone were placed at the east end of the bulkhead to prevent eroding of the shore by the action of the waves. The windmill was repaired.

Depot for the Ninth light-house district.—The Board has made recommendation in each of its annual reports for the last five years that a depot be established for the use of both the Ninth and Eleventh light-house districts near the Straits of Mackinac. It has now become necessary that a depot for the Ninth district alone be established there. It is needed for the storage of coal, buoys, and other material, including the heavy supplies needed for use in the many light-houses in the vicinity and as a winter harbor for 4 light vessels stationed near. The depot located at St. Joseph is at the other or southern end of the district and is of great use in supplying the southern light-houses. There are 100 light-houses in this district and 27 steam fog signals. There are about 100 buoys in position, and there should be near that number in reserve. Lake Michigan is some 350 miles long and about 50 miles broad, not counting Green Bay, with a large number of islands. With a depot at the northern end of this district, which will be about 300 miles from that near the southern end, the work of the district can be done more quickly, more economically, and with greater certainty. It is estimated that such a depot can be established for not exceeding $15,000, and it is recommended that an appropriation of that amount be made therefor.

TENDERS.

The Dahlia.—This iron screw steamer is in good condition. During the year she placed and took in buoys, delivered supplies, and made inspection trips. She steamed some 9,843 miles, and burned about 580 tons of coal. A new tender is a pressing necessity in this district.

New tender for the Ninth light-house district.—The tender *Dahlia* is too small and too slow to do the work of the district within the time allowed by the winter ice. She is now barely able to carry supplies, so as to deliver them on one trip, by crowding the holds, gangways, and living spaces; but when the gas tanks which are ordered are installed she will not be able to carry even her present load. During the last supply trip she had to steam about 1,350 miles, and as both this and the buoy trip work had to be accomplished in pleasant weather the tender should be more speedy, so as to cover the distance between the places in proper time. It is estimated that a suitable steam tender can be built for not exceeding $75,000, and it is recommended that an appropriation of this amount be made therefor.

The Amaranth.—This steel screw steamer was employed delivering materials for the construction of Plum Island Ranges, for repairs at Waugoshance, McGulpin Point, Old Mackinac Point, South Fox Island, South Manitou, Bailey Harbor Range, Eagle Bluff, Green Island, Cedar River, Point Peninsula, Squaw Island, Poverty Island, and Beaver Island light stations, in delivery of fog-signal boilers and machinery at North Manitou, South Manitou, and Milwaukee Pierhead light stations, returning worn-out fog-signal boilers, machinery, etc., to the Detroit depot, and in delivery of material for construction of fog-signal station at Menominee, Mich., and metal work for Squaw Point, Mich. She delivered 760 tons of material and steamed some 1,750 miles, consuming about 168 net tons of bituminous coal.

TENTH DISTRICT.

This district extends from the mouth of the St. Regis River, Lawrence River, New York, to the mouth of the River Rouge, De River, Michigan. It embraces all aids to navigation on the Un States shores and waters of Lakes Erie and Ontario and the upper p of the St. Lawrence, the Niagara, and the lower part of the Det rivers.

Inspector.—Commander Charles V. Gridley, United States Navy April 30, 1897; since then Commander T. F. Jewell, United St Navy.

Engineer.—Lieut. Col. Jared A. Smith, Corps of Engineers, Uni States Army.

In this district there are—

Light-houses and beacon lights
Light-vessels in position
Fog signals operated by steam
Fog signals operated by clockwork
Gas-lighted buoys in position
Other buoys in position
Steamer *Haze*, buoy tender, and for supply and inspection

All the lights in the district, except that at Presqu'ile and the ra lights at Conneaut, were extinguished or allowed to burn out in Dec ber, 1896, and were relighted between March 25 and April 1, 1 The Presqu'ile and Conneaut lights were maintained throughout winter for the benefit of certain car ferries.

LIGHT STATIONS.

——. *Oak Point, St. Lawrence River, New York.*—The following rec mendation, made in the Board's last annual report, is renewed:

> Range lights are needed to guide vessels clear of the rocky shoals near the channel of the river at Oak Point, between Ogdensburg light and Cross Over Is light. It is estimated that these can be established for $10,000, and it is rec mended that an appropriation of this amount be made therefor.

——. *Carlton Island, St. Lawrence River, New York.*—A site for light station was selected and a survey made embracing an are about two acres on the westerly side of Carlton Island. The neces steps are being taken to acquire a title to the land.

——. *Chapman Shoal, St. Lawrence River, New York.*—The follow recommendation, made in the Board's last annual report, is rene

> This shoal is of solid rock, the top of which is awash at ordinary stag water. It stands in mid-channel between Beckwith Island and North Colb

10

Tenth District.

Island, and forms a dangerous obstruction. It is proposed to establish here a light and fog-signal station. It is estimated that this can be done for $25,000, and it is recommended that an appropriation of this amount be made therefor.

1189. Tibbetts Point, St. Lawrence River, New York.—A duplicate steam fog-signal apparatus was established. The signals made with a 10-inch whistle are regulated by a Crosby automatic apparatus in duplicate. The fog signal was ready for operation on the opening of navigation, 1897. As soon as practicable a sound reflector is to be provided to throw the sound lakeward. The ground about the fog-signal house was raised and graded, and a stone wall some 65 feet long, 3 feet thick, and 12 feet high was built at the foot of the bank near the fog-signal house and filled in behind with stone, to protect the bank.

1191. Galloo Island, Lake Ontario, New York.—A square iron oil house was erected. The steam fog signal authorized by act of Congress June 11, 1896, was practically completed on June 30, 1897. The signals are made with a 10-inch whistle regulated by a Crosby automatic apparatus in duplicate. Some minor repairs were made.

1192. Stony Point, Lake Ontario, New York.—The oil-house metal work previously purchased was erected. The old oil room was fitted up for a living room and various repairs were made.

1193. Oswego Lake, Ontario, New York.—Some 154 feet of 5-inch vitrified pipe, provided with traps, vent pipes, etc., was laid, connecting the keeper's dwelling with the public sewer. The keeper's dwelling is being rebuilt under contract. The work is to be completed on September 5, 1897. The matter of custody of the breakwater has been adjusted, and the boathouse, which would be in the way of vessels wishing to tie up to the breakwater, has been moved to a location near the shore.

1200, 1201. Genesee, Charlotte Harbor, Lake Ontario, New York.—A new foot valve for the water-supply pipe of the fog-signal boiler was provided. The Rochester Electric Railway Company has vacated the light-house premises. On October 28, 1864, a lease was executed to William Rankin, for fifty years, of a portion of the light-house lot. A suit at law was begun to terminate the lease and recover possession of the premises because of nonfulfillment of the terms of the lease. A branch of the New York Central Railroad is laid across the light-house lot and trains are regularly run. No authority for this purpose has been obtained from the United States.

1202. Braddock Point, Lake Ontario, New York.—This light was first exhibited on the night of August 17, 1896. The brick barn begun the previous year was completed. The lamp used for this light was replaced with a third-order, three-wick burner. A copper smoke conductor was provided. A square iron oil house was erected on a concrete foundation. Minor repairs were made.

1206. Fort Niagara, Niagara River, Lake Ontario, New York.—Under the contract of June 25, 1896, the keeper's dwelling was rebuilt. The grade of the lot around the dwelling was raised and a walk was built across the rear end of the dwelling. A gravel driveway leading from the street to the lot was made, and 100 feet of fence was rebuilt on the street line.

1212. Dunkirk, Dunkirk Harbor, Lake Erie, New York.—The building occupied as a dwelling by the assistant keeper was rebuilt. A fence was put up between the barn and the street line. A sewer was laid leading to the lake. The barn was rebuilt and enlarged. Some 733 square feet of cement walk was laid. Various repairs were made to the keeper's dwelling.

1213. Dunkirk Pierhead, entrance to Dunkirk Harbor, Lake Erie, New York.—Designs were made for a stone and concrete pier with crib substructure to replace the old wrecked pier upon which this light formerly stood. The pier will be commenced next year. A lens lantern was substituted for the tubular lantern, to increase the intensity of the light.

1219. Presqu'ile, entrance to Erie Harbor, Presqu'ile Bay, Pennsylvania.—The lantern of the tower was raised 17 feet 4 inches by building up the top of the tower that the light may show above the trees growing between the light and the lake shore. Various repairs were made.

1221. Conneaut, Lake Erie, Ohio.—This light was transferred to a beacon built near the shore line on the west side of the entrance to Conneaut Harbor to form, with the light on the outer end of the pier, a range for approaching the entrance to the harbor. The light was first exhibited in the new tower on the night of March 1, 1897. The ell part of the keeper's dwelling was rebuilt two stories in height and general repairs were made throughout the other part. A driveway was made leading from the street to the barn. The cement walk was extended and the lot was graded.

1222. Ashtabula, front, entrance to Ashtabula Harbor, Lake Erie, Ohio.—On September 28, 1896, a steamer, while passing out of Ashtabula Harbor, ran into the west pier, breaking one of the guard timbers and starting up some of the plank in the platform in front of the fog signal. The damage was repaired by the vessel's agent. Various repairs were made.

1223. Ashtabula Pierhead, rear, entrance to Ashtabula Harbor, Lake Erie, Ohio.—The frame structure erected for the temporary display of the rear range lights was taken down and the lights were transferred to a tower erected on the west side of the west pier. The lights were first exhibited from the new beacon on the opening of navigation, 1897. The number of lights was reduced from three to two, the lower one being red and the upper one white, and the distance between them was increased to 6 feet. A square iron oil house was erected. Various repairs were made.

1227. Cleveland East Breakwater, entrance to Cleveland Harbor, Lake Erie, Ohio.—This light was unreliable because it could not be lighted in very bad weather. To give it permanency and greater intensity, a 5-day lens lantern was placed on an improved beacon.

NOTE.—The light was exhibited with the new lantern on August 20, 1897.

1228. Cleveland West Breakwater, entrance to Cleveland Harbor, Lake Erie, Ohio.—The boathouse was converted into quarters for the keepers. Two comfortable rooms are thus provided. Various repairs were made.

1229. Cleveland East Pier, entrance to Cleveland Harbor, Lake Erie, Ohio.—On the completion of the concrete pier, this light was transferred from the old pier to the outer end of the new pier, about 121 feet southward of its former position. The focal plane of the light was lowered about 6 inches. The boathouse was transferred to the west pier. Small wooden ladders were provided on the east and west sides of the pier for the use of the light keepers.

1230. Cleveland West Pier, entrance to Cleveland Harbor, Lake Erie, Ohio.—Ladders on both sides of the pier were provided for the use of the light keepers in landing from their boat. Various repairs were made to the keeper's dwelling.

1231, 1232. Black River Pierhead range lights, Lake Erie, Ohio.—The front beacon was removed to within 27 feet of the outer end of the new extension to the west pier. The lower ends of the beacon legs were spliced with new materials. Various repairs were made.

1233. Vermillion, entrance to Vermillion Harbor, Lake Erie, Ohio.—About 100 feet of elevated walk on the west pier was rebuilt. Various repairs were made.

1234. Huron, entrance to Huron Harbor, Lake Erie, Ohio.—About 200 feet of the elevated walk leading to the pierhead beacon was rebuilt and the remainder of the walk was repaired.

1235, 1236. Cedar Point, entrance to Sandusky Bay, Lake Erie, Ohio.—The 256-foot extension to the wharf was completed by contract. Minor repairs were made.

1237, 1238. Sandusky Bay Range, on the bar, entrance to Sandusky Bay, Lake Erie, Ohio.—A 5-day lens lantern was installed in the rear beacon lantern. Additional stone was placed about the cribs of both beacons under contract to prevent the undermining of the foundations by lake action. Various repairs were made.

——. *Sandusky Bay Outer Range, entrance to Sandusky Bay, Lake Erie, Ohio.*—Designs for the structures were prepared and contract was made for the erection of the buildings. The station will consist of a dwelling, with tower attached, upon a concrete pier 50 feet square, and a tower upon a crib 40 feet square, about 2,000 feet distant from the former.

——. *Sandusky Bay Ranges, on the outer bank of the elbow of the dredged channel, Sandusky Bay, Lake Erie, Ohio.*—With the exception of the two iron shafts with their balconies, and lanterns of the rear beacon, the old structures on the cribs were removed.

Tenth District.

1240. South Bass Island, Lake Erie, Ohio.—The contract made for the construction of the buildings for this station was not carried out. The bidders failed to execute the required bond. All of the bids received in response to a readvertisement of the work were rejected, as excessive and not within available funds. The construction of the keeper's dwelling and tower by hired labor and open-market purchases of material was, therefore, undertaken, and with the close of the fiscal year the work was practically completed. The illuminating apparatus, a fourth-order lens, was installed in the tower lantern. A square iron oil house was erected.

NOTE.—The light was exhibited on July 10, 1897.

1241. Green Island, on the west end of Green Island, Lake Erie, Ohio.—The stairs leading to the lantern in the tower were provided with an iron hand rail. The front entrance of the tower was provided with a new screen door and 6 lights of ruby glass were purchased and delivered at the station for spare lights for producing red flashes of light. About 1,200 feet of plank walk, 2 feet wide, leading from the dwelling to the boathouse and wharf was constructed. The walks about the dwelling and to the east shore were rebuilt, and a garden fence was constructed. Various repairs were made.

1242. Port Clinton, entrance to Port Clinton Harbor, Lake Erie, Ohio.—The new light was first exhibited on July 15, 1896. The keeper was permitted to occupy the keeper's old dwelling, which was occupied heretofore by the custodian of public property at this station during the period of discontinuance of the light. Minor repairs were made.

1246, 1247. Maumee Bay, Straight Channel Range, Maumee Bay, Lake Erie, Ohio.—The keeper's dwelling is being rebuilt by contract. The light which has been shown from the top of the buoy house, has, since the removal of the latter to a new location, been exhibited from the top of the boathouse, a few feet distant from its former position.

1248. Maumee Bay Ranges, Maumee Bay, Lake Erie, Ohio.—The south light, which has served as the rear light of the range guiding from Turtle Island, was discontinued at the opening of navigation in March, 1897. The illuminating apparatus was removed, and the crib and lantern were left in the care of the light keeper. Bids were asked for building the two towers and for the foundations. The lowest bid, $7,740, for the construction of the towers above the foundations was accepted, and a contract for the work was made, the work to be completed September 30, 1897, unless delayed beyond that time by the noncompletion of the foundations, which were to be built under a separate contract. The lowest bidder for the foundations subsequently withdrew his bid. After a readvertisement contract was made with the lowest bidder, for $2,458.91, the work to be completed on June 30, 1897. At the close of the fiscal year the work was incomplete, but the contractors were actively engaged upon the work. The work upon the towers has progressed fairly well, but their final completion at the sites will necessarily be delayed by the noncompletion of the foundations on contract time.

1249, 1250. Manhattan Range, Maumee Bay, Lake Erie, Ohio.—The rear beacon, which was an open frame to the inclosed top section, was entirely inclosed and the interiors were finished. Various repairs were made.

——. *Maumee Outer, Maumee Bay, Lake Erie, Ohio.*—The premises continue in the care of a resident custodian.

——. *Maumee Middle, Maumee Bay, Lake Erie, Ohio.*—The premises are looked after by the custodian of the Maumee Outer Range.

——. *Maumee Inner, Maumee Bay, Lake Erie, Ohio.*—The property is looked after by a resident custodian.

——. *Toledo, entrance to Toledo Harbor, Ohio.*—Access to Toledo Harbor is now afforded to deep-draft lake vessels through the straight channel, which has been dredged and improved by the Government at great expense. A permanent light and fog-signal station is now urgently required to mark the outer end of this channel. The lake commerce of Toledo is large and increasing. It is estimated that a light and fog signal can be established here at a cost not exceeding $75,000, and it is recommended that an appropriation of this amount be made therefor.

1257, 1258. Grosse Isle (north channel) Range lights, Detroit River, Michigan.—A brick cistern holding 2,000 gallons was built. Plans for a keeper's dwelling and for a boathouse and walk from the front beacon to the shore were prepared.

The following recommendation was made in the Board's last three annual reports:

> The site was paid for and the beacons were completed, but funds have not permitted the erection of a dwelling. The beacons are situated near the north end of the island, where the houses are almost exclusively owned and occupied by summer residents, and there is no place where a keeper can live within a reasonable distance. The construction of a dwelling is therefore essential to the proper maintenance of the lights. A suitable dwelling may be constructed for $3,500, and an appropriation of that amount is recommended for that purpose.

1259, 1260. Grosse Isle (south channel) Range lights, Detroit River, Michigan.—Various repairs were made.

The following recommendation was made in the Board's last four annual reports:

> A new dwelling is needed for the keeper of this range. He is now living in a dwelling on Mamajuda, which is not only unsuitable for the purpose but is too far away. It is deemed dangerous for the keeper to live on the side of the channel opposite to the lights. A proper dwelling can be built on a foundation partially in the water for not exceeding $5,000, and it is recommended that this amount be appropriated for that purpose.

Tenth District.

1261, 1262. Mamajuda Island Range lights, Detroit River, Michigan.—A walk 400 feet long, with iron hand rail, on a single row of piles, was built by contract between the north shore of the island and the front beacon. Minor repairs were made.

1264. Grassy Island, on Grassy Island Shoal, Detroit River, Michigan.—An embankment was thrown up by a dredge between the main and Fishery islands, a distance of about 1,000 feet, to facilitate communication with the front light. Various repairs were made.

1265, 1266. Grassy Island (north channel) Range, Detroit River, Michigan.—The buildings, dwelling and front beacon, rear beacon and boathouse, including the foundation, were built by contract, for $5,790, exclusive of illuminating apparatus. The lights were first displayed on April 1, 1897. Some additional work, not covered by the contract, was done, chiefly to an embankment about the dwelling and front beacon. This range completes the system of range lights in the Detroit River.

1267, 1268. Ecorse Range lights (Grassy Island), Detroit River, Michigan.—An earth embankment was thrown up by a dredge connecting the two beacons of this range. The embankments, where decayed by ice and river currents, were repaired by cross piling secured with stakes and weighted with earth.

The following statement made in the Board's last two annual reports is renewed:

> The lights of this range are located on the flats, in water about 3½ feet deep, in front of a wide marsh. The nearest place where a keeper could reside is in the village of Ecorse, about three-fourths of a mile distant in a direct line. If he should live there it would be necessary to row fully a mile. This would be quite difficult at times, as the ice forms and remains in the shallow water while the main channel is open. The light-house reservation, which is 100 feet wide and about 700 feet long, is entirely submerged, and the bottom is so soft that a secure foundation can be had only upon piles protected with riprap stone. It is indispensable to the proper care of this station that the keeper live on its site. This can be made possible only by the erection here of a keeper's dwelling. It is estimated that a suitable one can be erected for $5,000, and it is recommended that an appropriation of this amount be made therefor.

REPAIRS.

At each of the following-named stations repairs more or less extensive were made during the year:

1184. Ogdensburg, N. Y.
1186. Rock Island, N. Y.
1190. Sacketts Harbor, N. Y.
1197, 1198, 1199. Big Sodus, N. Y.
1203. Oak Orchard, N. Y.
1210. Buffalo Breakwater, N. Y.
1220. Conneaut Pierhead, Ohio.
1224. Fairport, Ohio.
1239. Marblehead, Ohio.
1243. West Sister Island, Ohio.
1244. Turtle Island, Ohio.
1253. Detroit River (Bar Point), Mich.
1263. Grassy Island (South Channel) Range, Mich.

Tenth District.

LIGHT-VESSELS.

1252. Bar Point light-vessel, No. 59, Lake Erie, Michigan.—This vessel was removed from her station December 15, 1896, and laid up at the light-house depot at Detroit. She was replaced on her station April 7, 1897.

1254. Limekiln Crossing light-vessel (south), No. 64, Detroit River, Michigan.—This vessel was removed to Detroit on December 16, 1896, and replaced on her station April 7, 1897.

1255. Limekiln Crossing light-vessel (north), No. 65, Detroit River, Michigan.—This vessel was removed to winter quarters at Detroit December 16, 1896, and replaced on her station April 7, 1897.

Light-vessel and two float lights for marking the new channel at Ballards Reef, above Limekiln Crossing, on the lower Detroit River, Michigan.—The act approved June 4, 1897, appropriated $1,500 for a light-vessel and two float lights for marking the new channel at Ballards Reef, above Limekiln Crossing, on the lower Detroit River. The proper measures have been taken to have this done as soon as practicable.

1256. Ballards Reef light-vessel, No. 63, Detroit River, Michigan.—This vessel was removed to Detroit December 16, 1896, and replaced on her station April 7, 1897.

FOG SIGNALS OPERATED BY STEAM OR HOT AIR.

1189. Tibbetts Point, St. Lawrence River, New York.—A 10-inch steam fog whistle was established at this station at the opening of navigation 1897. The signal sounds blasts of three seconds' duration separated by silent intervals of 87 seconds. The signal was in operation 79 hours, and consumed 3 tons of coal.

1191. Galloo Island, Lake Ontario, New York.—A 10-inch steam fog whistle has been established at this station. It will sound blasts of 10 seconds with silent intervals of 30 seconds.

NOTE.—It was put in operation on August 2, 1897.

1200. Genesee, Lake Ontario, New York.—This 6-inch steam whistle was in operation some 50 hours, and consumed about 4 tons of coal.

1210. Buffalo Breakwater (north end), Lake Erie, New York.—This 10-inch steam whistle was in operation some 414 hours and consumed about 31 tons of coal.

1222. Ashtabula, Lake Erie, Ohio.—This 6-inch steam whistle was in operation some 35 hours, and consumed about 3 tons of coal.

1228. Cleveland West Breakwater (east end), Lake Erie, Ohio.—This 10-inch steam whistle was in operation some 610 hours, and consumed about 34 tons of coal.

1252. Bar Point light-vessel, No. 59, Lake Erie, Michigan.—The 6-inch steam whistle was in operation some 60 hours, and consumed about 3 tons of coal.

1253. Detroit River (Bar Point), Lake Erie, Michigan.—This 10-inch steam whistle was in operation some 127 hours, and consumed about 11 tons of coal.

Tenth District.

The time required to get steam for these fog signals varies from 45 to 75 minutes. An improvement in this regard is extremely desirable.

The fog bells at Oswego Breakwater, Fair Haven, N. Y., and Presqu'ile Pierhead, Pennsylvania, are in good condition.

BUOYAGE.

A spar buoy was placed on Rattlesnake Shoal in Niagara River. A spar buoy was placed to mark the inner end of the dredged channel in Sandusky Bay. A spar buoy was placed on American Eagle Shoal, Lake Erie. A nun buoy was placed on Kellys Island South Shoal. A spar buoy was placed in the Ballard Reef Channel, Detroit River, to mark an obstruction which is now being removed, and the buoy will soon be discontinued. The spar buoy on Trenton Shoal in the West Channel of the Detroit River was discontinued.

Gas buoys were placed as follows: One at Bay State Shoal, 1 at Empire Shoal, and 1 at Chapman Shoal, all in the St. Lawrence River, to replace the spar buoys formerly at these points; 1 at the entrance to Presqu'ile Bay to replace the can buoy formerly there; 1 in Maumee Bay to replace the oil-lighted buoy at the inner end of the straight cut, and 3 in the Detroit River to mark the channel south of Ballards Reef.

The buoys in Lake Ontario and the St.Lawrence River are cared for by contract. The work is fairly well performed.

NOTE.—Since July 1, 1897, the following buoys were replaced by gas buoys, viz: The entrance buoy at Ogdensburg, N. Y.; the buoy on Rock Island Point, St. Lawrence River, and the buoy on Charity Shoal, Lake Ontario. Gas buoys were also established on Sunken Rock and Feather Bed Shoal on August 3, 1897.

DEPOTS.

Rock Island, St. Lawrence River, New York.—This depot is in fair condition, but should be enlarged to provide needed facilities for handling the buoyage of this part of the district. With a view to making improvements of this kind a small hydrographic survey was made in the vicinity of the landing wharf.

Buffalo, Lake Erie, New York.—The following statement was made in the Board's last annual report:

> The buoy shed is too small, very old, and in bad condition. The keeper's dwelling is just alongside of the slip constructed for the tender. The slip is filling up, and is in bad condition. This depot is very small and badly located. It is useless as a winter harbor for tenders and light-vessels, and it is at present necessary to lay these up at the Detroit depot. This is out of the limits of the Tenth district, and its limited accommodations are needed by the tenders and light-vessels of the Eleventh light-house district. Matters have recently been made more serious by the work of deepening the channel to Buffalo, which has caused a movement and settlement of the wharf and keeper's dwelling at the Buffalo depot, and may require its abandonment at an early day.

Tenth District.

It is estimated that a new depot can be established for not exceeding $35,000, and it is recommended that an appropriation of that amount be made therefor.

Sandusky (*Cedar Point*), *Ohio.*—A raised platform at the shore end of the wharf was constructed, and an iron track for a car was laid the entire length of the wharf for use in handling buoys, and their appurtenances.

Maumee Bay, *Lake Erie*, *Ohio.*—The buoy house was moved from and placed partly upon the platform between the crib and pile protection work, and partly upon piles driven for the purpose, to afford room for rebuilding the keeper's dwelling.

TENDER.

The Haze.—This is the only tender in the district. She was extensively repaired in the last few years. Considering that she is 21 years old she is in fair condition, but she is entirely too small to carry the full quantity of supplies for the district, or to furnish proper quarters for the inspector and officers, and she can last but a few years longer at most. During the past year she has been fitted with four tanks for the storage of Pintsch gas and a compressing pump for supplying the gas to the lighted buoys, and her stowage room, both in the hold and between decks, has thus been materially reduced. The *Haze* was laid up in winter quarters at Detroit on December 20, 1896. She resumed work on March 15, 1897. She steamed some 7,920 miles during the year, and consumed about 342 tons of coal.

New tender for the Tenth light-house district.—A new modern vessel is greatly needed in this district. The *Haze* is not only too old to be of much further service, but she is not large enough to do the increased and still further increasing work of the district. It is estimated that a proper tender can be built for not exceeding $75,000, and it is recommended that an appropriation of this amount be made therefor.

OIL HOUSES.

Oil houses were erected one at each of the following-named light-stations: Ashtabula, Ohio; Galloo Island, New York; Braddock Point, New York; Stony Point, New York; South Bass, Ohio; Grassy Island, Michigan. The metal work for these was purchased the previous year.

The necessity for isolated fireproof oil houses at many light-stations in this district is great. The following-named light-stations, which were specified in the last annual report, are again mentioned as being in the greatest need of such a place for storing oil:

Presqu'ile Pierhead, Pennsylvania	$350.00
Manhattan Range, Ohio	350.00
Grassy Island (north channel) range, Michigan	350.00
Genesee, New York	350.00
Sister Islands, New York	350.00
Cedar Point, Ohio	400.00
Green Island, Ohio	350.00

ELEVENTH DISTRICT.

This district extends from the mouth of the River Rouge, Det River, Michigan, to the westerly end of Lake Superior. It embr all aids to navigation on the United States shores and waters of La St. Clair, Huron, and Superior, the upper part of the Detroit Ri the St. Clair and St. Marys rivers, and that part of the Straits of Ma nac lying to the eastward of a line drawn across the straits just to eastward of the Old Mackinac Point light-station, Michigan.

Inspector.—Commander William M. Folger, United States Navy.

Engineer.—Maj. Milton B. Adams, Corps of Engineers, United St Army.

There are in the district—

Light-houses and beacon lights, including 18 post lights
Light-vessels in position
Day or unlighted beacons
Fog signals operated by steam
Fog signals operated by clockwork
Bell buoys in position
Other buoys in position
Steamer *Marigold*, buoy tender, and for supply and inspection
Steam barge *Warrington*, for construction and repair
Steamer *Amaranth*, for construction and repair
Steam launch *Lotus*, for construction and repair

LIGHT-STATIONS.

1272. Windmill Point, Lake St. Clair, Michigan.—Some 250 fee sidewalk was rebuilt. Minor repairs were made.

—. *Lake St. Clair, Twenty-Foot Channel, Michigan.*—The damage d to the middle beacon by a vessel colliding with it was repaired. three pile clusters were carried away by the ice during the winter were rebuilt. The lower pile cluster that was carried away by steamer *Gordon Campbell* was renewed.

The following recommendation, made in the Board's two last an reports, is in effect renewed:

> The new 20-foot channel begins at a point 1¼ miles ENE. of Windmill Point runs NE. ¼ E. about 6⅝ miles, where the natural depth of water is something ov feet. This portion of the channel when completed is to be 800 feet wide, wi mean depth at low water of 20 feet.
>
> The dredged channel again begins at a point 2¼ miles SW. ⅝ S. from the sout entrance to the ship canal, but decreases in width as the canal is approached. upper stretch is now fairly marked by the St. Clair Flats Canal lights, but believed to be necessary to have additional lights at the southern entrance to cut, as in thick weather vessels of extreme draft would have difficulty in findi It is estimated that this new dredged channel can be effectively lighted fo exceeding $20,000, and it is recommended that an appropriation of this amou made therefor.

Eleventh District.

1286. Middle, No. 8, Herson Island, St. Clair River, Michigan.—Six oak piles were driven and 280 running feet of 2-foot walk was rebuilt.

1287. Upper, No. 9, Herson Island, St. Clair River, Michigan.—This light was moved on May 15, 1897, to within about 525 feet of the front light.

1289. Middle, No. 11, Russell Island, St. Clair River, Michigan.—This range light. which was carried away by the ice during the winter, was renewed.

1298. Sand Beach, Harbor of Refuge, North Entrance, east light, Lake Huron, Michigan.—The tower was rebuilt from the sill up—20 feet. Various repairs were made.

1300. Pointe Aux Barques, Lake Huron, Michigan.—The material for repairs to the keeper's dwelling was delivered at the station by the light-house tender *Amaranth.*

1301. Port Austin Reef, Lake Huron, Michigan.—An estimate of the cost of repairing the crib, modifying the tower and fog-signal buildings, rebuilding the boathouse, and constructing a landing crib was made, and the material was purchased. Material for an oil house was also purchased.

1302, 1303. Saginaw River Range, Lake Huron, Michigan.—A portion of the light-house reservation was advertised for sale by auction. The highest bid being but $1,000, it was not accepted. Material for fencing in the assistant keeper's dwelling was purchased.

1305. Tawas, Lake Huron, Michigan.—The landing dock was extended 640 feet into deeper water and various repairs were made.

1308. Alpena, Lake Huron, Michigan.—The metal work for an oil house was purchased.

1309. Thunder Bay Island, Lake Huron, Michigan.—The landing and crib were extended 151 feet, and 30 feet of the old landing was repaired and 80 feet of railroad track was relaid. The roof of the dwelling was repaired.

—. *Middle Island, Lake Huron, Michigan.*—The following recommendation, made in the Board's last annual report, is renewed:

> A light and fog signal are now needed here both in order to make available the harbor of refuge behind Middle Island, the only one in the vicinity having sufficient depth of water for the modern deep-draft lake vessels, and to mark a turning point in the regular course of vessels bound up or down the coast. It is proposed to establish a light and fog-signal station on Middle Island. This it is estimated can be done for $25,000, and it is recommended that an appropriation of this amount be made therefor.

1312. Presque Isle, Lake Huron, Michigan.—The old light-house reservation, sections 16 and 17, at Presque Isle Harbor, Michigan, was sold to the highest bidder. A plan and estimate of cost for an extension to the fog-signal water supply was made. The material was ordered and delivered at the Detroit light-house depot ready for transportation to the station by the light-house tender *Amaranth*. Various repairs were made.

1313. Forty-Mile Point, Lake Huron, Michigan.—A fourth-order white light flashing every 10 seconds, and a steam fog-signal, were established here on May 1, 1897. The tender *Amaranth* landed the working party and a portion of the material at the site on July 5, 1897. A barn and boat-house were completed, a landing dock 120 feet long was built with a tramway in the center and an incline 6 feet wide to the top of the bank, with rails continued up past the fog signal and to the rear of the site for the dwelling. A plank walk was laid on railroad sleepers to the site of the dwelling. A well 6 feet square and 7½ feet deep was excavated, and a windmill and tank were erected. During August boatways were built, and the oil house was completed. A crib for the dock was built, ballasted, and decked, forming a T end to the pile dock. The fog signal house was finished. In the rear of the buildings, for 40 feet south, about two acres of land was raised about three feet and cleared. The tower and dwelling were completed during October. The barn was moved to its permanent site and the grading and clearing were finished. During November the site was surveyed and platted, the fog signals were piped, the boiler covering was put on, and the machinery was tested. Work was completed on November 23, 1896, and the station was left in charge of a custodian for the winter.

1315. Detour, Lake Huron, Michigan.—New fog signal boilers, of improved pattern, were placed. The fog-signal water-supply crib was extended 82 feet. The boat landing was extended 32 feet, filled with stone, and covered with small timbers. This is a fixed white light of the third order. It should be raised to at least the second order, and should be flashing in character to increase its visible range, as it is the most important light for entering the Sault River. The Detour Range lights on Frying Pan and Pipe Island should be increased in power, and Pipe Island made a flashing light. These lights are at present fixed red of the fifth and sixth order. These improvements are now in contemplation.

1316. Round Island, Straits of Mackinac, Michigan.—The fog-signal boilers and machinery were completed, delivered, and placed, and the fog signal was established October 20, 1896.

1319. Cheboygan, Straits of Mackinac, Michigan.—A Smith heater was set up and piped to both boilers and the water tank. Various repairs were made.

1320. Cheboygan Crib, Straits of Mackinac, Michigan.—Quarters for the assistant keeper on the crib were built, together with pile protection for the boat on the northwest corner of the crib. Three and one-half cords of riprap were placed.

Eleventh District.

1321. *Cheboygan River Range, front, Straits of Mackinac, Michigan.*—The following recommendation, made in several previous annual reports of the Board, is renewed:

> The sanitary condition of this station is bad. The light-house lot is narrow and its entire front is occupied by the light-house buildings. The cellar is often inundated, and there is no drainage nor means of any except to the river over private land. It is now proposed to extend the light-house lot back to the river by purchase at an estimated expense of $1,750. Recommendation is therefore made that an appropriation of this amount be made for this purpose.

——. *Mud Lake, St. Marys River, Michigan.*—The following recommendation, made in the Board's last annual report, is renewed:

> This important turning point is now marked only by a buoy and distant range lights on shore. They are not effective guides. It is proposed to establish a light to mark this turning point in the channel through Mud Lake by a proper light. It is estimated that this can be done for $3,500, and it is recommended that an appropriation of this amount be made therefor.

1332, 1333. *Dark Hole Range, St. Marys River, Michigan.*—The site, a strip of land some 800 feet long, was bought.

1349. *Church Point, St. Marys River, Michigan.*—The work of rebuilding the foundation crib and superstructure was completed in July, 1896. The superstructure of the crib was carried away by the ice during last winter, and steps were taken to rebuild it. The sloping sides of the crib were started 2 feet below water level and built up to 6 feet above and filled with stone, and three of the side walls were covered with oak planking. A spar was placed in position, a lamp house was constructed and painted, and 17½ cords of stone riprap and ballast were placed.

1366–1392. *Hay Lake Channel, St. Marys River, Michigan.*—Bids for the construction of seven cribs to replace floats at Nos. 1, 3, 5, 8, 13, 14, and 15 were received and contracts were made with the lowest bidders. Stone foundations were put in under contract for cribs at stations Nos. 13, 14, and 15 in September, 1896—$90\frac{52}{128}$ cords at No. 13, 86¾ cords at No. 14, and $44\frac{27}{128}$ cords at No. 15, making a total of $221\frac{54}{128}$ cords in all. The placing of foundation stone was completed during October in order to settle during the winter. The following work was done in the spring of 1897: The seven cribs were built up to 6 inches above water level when sunk in position, and two of them, stations Nos. 14 and 15, were sunk in position and partly filled with ballast.

1372, 1373. *Middle Neebish Cut Range, front and rear, Stations 7 and 9, Hay Lake Channel, St. Marys River, Michigan.*—Repairs were made to the targets, guys, and masts of the booms of these lights, and new blocks and halyards were provided for each. After the booms and day marks were replaced in position a red-lamp house was built.

1375, 1376. *Lower Hay Lake Cut Range, Stations 10 and 11, Hay Lake Channel, St. Marys River, Michigan.*—The site on which these lights stand was purchased. Various repairs were made.

Eleventh District.

——. *Head of St. Marys River, St. Marys River, Michigan.*—The following recommendation, made in the Board's last annual report, is renewed:

Two lights are now maintained at the head of St. Marys River at private expense. It is proposed to replace them with a set of range lights to mark the channel at the entrance to St. Marys River. It is estimated that this can be done for $1,000, and it is recommended that an appropriation of this amount be made therefor.

1399. Point Iroquois, Lake Superior, Michigan.—Some 448 running feet of new walk was laid and several hundred feet of old walk was repaired. The landing dock was all built up to 3 feet above water level and decked with new planking. Various repairs were made.

1400. Whitefish Point, Lake Superior, Michigan.—The work of rebuilding and enlarging the fog-signal building was begun on July 7, 1896, and during that month the fog-signal boilers and machinery under contract were completed. They were delivered by the light-house tender *Amaranth* in September. In October all pipe connections were made; the new boilers were painted and covered and tested under steam pressure. The machinery and whistles were also thoroughly tested. The old boilers, whistles, and machinery were taken down, the boilers were thoroughly cleaned and painted, and the machinery, fittings, etc., were cleaned, oiled, and boxed. Various repairs were made.

——. *Crisps Point, Lake Superior, Michigan.*—The following recommendation, made in the Board's annual report, is renewed:

This is a dangerous point for vessels bound down the lake in thick weather. These vessels all try to make Whitefish Point, but a slight variation in their course from the nearest point of departure will run them ashore near Crisps Point. Several wrecks have occurred here. It is proposed to establish a light and fog-signal station on or near Crisps Point. This it is estimated can be done for $18,000, and it is recommended that an appropriation of this amount be made therefor.

1401. Grand Marais Harbor of Refuge, Lake Superior, Michigan.—The sundry civil appropriation act, approved June 4, 1897, provided that the unexpended balance of the $15,000 appropriated by the act of March 2, 1895, for a "light and bell" at this place, or so much of it not exceeding $2,000 as may be necessary, be made available for constructing an additional light on shore to serve as a range and completing the station.

NOTE.—Contract was made on September 27, 1897, for the erection of a skeleton tower at this place.

1403. Big Sable, Lake Superior, Michigan.—Contracts for the fog-signal boilers and machinery were made, and they were completed and delivered in September, 1896. Material for a duplicate fog signal was purchased and delivered at the Detroit light-house depot. A working party and the material were delivered at the station by the tender *Amaranth.* The building was completed in June, 1897, and the structure was prepared to receive the boilers and machinery. A new crib was built and sunk in position, filled with ballast stone, and a well box was placed in it for fog-signal water supply. A sea wall was built on the front and both sides, 10 feet of the landing pier was refilled with ballast stone, the pier was built 1 foot 3 inches higher, and a proper sidewalk was laid. Various repairs were made.

NOTE.—The fog signal was established September 1, 1897.

1408. Marquette, Lake Superior, Michigan.—A parabolic sound deflector, consisting of a pine framework, covered outside and in with iron and packed with sawdust, was erected on building No. 2, and the whistle repiped into the deflector. Minor repairs were made.

1411. Big Bay Point, Lake Superior, Michigan.—The construction was continued. The brickwork of the tower was finished, the iron deck placed, and the oil house completed during July, 1896. The carpenter work on the double dwelling and tower was completed ready for plastering, the stairs were set in place, the buildings were roofed, all tin work was finished, all the sash of the double dwelling set, the interior woodwork and plastering of the fog-signal house were completed, the double dwelling and tower were painted, and the second story and main hall of the first story of the east half of the dwelling were given a finishing coat of paint. The painting of the brickwork, cornice, and window frames of the double dwelling was finished. A fog-signal water-supply crib, 20 feet wide, was framed, sunk in place, and partly filled with stone. During September the boilers and engines were placed in the fog-signal building, all piping done, and the tank was erected. Both boilers were tested. The light was exhibited on the night of October 20, 1896. The deed from the Keweenaw Association for additional land for a site was recorded. The fog signal was overhauled. Various repairs were made.

1416, 1417. Portage Range, Lake Superior, Michigan.—The 300-foot sidewalk between the dwelling and the beacon was renewed, and minor repairs were made.

1418, 1419. Portage River Range, Lake Superior, Michigan.—Piles were driven around the new crib of the front light, and secured with driftbolts.

—. *Portage Lake and River lights, Lake Superior, Michigan.*—Title for the sites was obtained. A sight for the keeper's dwelling was purchased separately. Specifications, plans, and detailed estimates of cost for the construction of light-house structures necessary for the proper lighting of these channels were made, the material was obtained and delivered at the Detroit light-house depot during March, 1896, when the work of framing material was begun. An oil house and boathouse combined, with a landing, was built. The rear range, consisting of a pole with target, was prepared, for erection on the corner of the boathouse. The front range was completed, the foundation being a crib, with house and target front. The distance between the lights is about 450 feet. The following named work was done in June: The single dwelling was completed. Rouleau Point ranges were completed. At Pilgrim Point the piles were driven and the material was made ready for erection. For the double dwelling the dock was built, the cellar was dug, and all walls brought to grade, draintile laid, and a trench dug for 200 feet of sewer. Ranges Nos. 1 and 2 were located and the material was made partly ready for erection. Range No. 3, consisting of a pile cluster, was completed and painted. Range No. 4, consisting of a post light on piles and situated in the marsh, was nearly completed. Range No. 5, consisting of a pile cluster, was completed and painted. Range No. 6, a post light on piles in the marsh, was almost completed. Range No. 7, a target house on a pile foundation in the marsh, was almost completed. The material for Range No. 8 was all prepared, ready for erection. Range No. 9, a pile cluster with target house, was finished except painting. Range No. 10, rear light, was erected on piles in the marsh on Battle Island and completed. Range No. 11, the turning light, was completed. Range No. 12, the front range with Range No. 10, was completed. Range No. 13 was completed, but was run into by a passing steamer and badly injured. It is expected that the lights can be established at an early date.

NOTE.—These lights were established on August 18, 1897.

1422. Mendota, Lake Superior, Michigan.—The characteristic of the light was changed on October 31, 1896, from fixed white varied by a white flash every 45 seconds to a fixed white light.

1423. Manitou, Lake Superior, Michigan.—A dock 60 feet long and 8 feet wide and 72 feet of boat ways were built. Various repairs were made. This is a fixed white light varied by white flashes, and should be raised to the second order to increase its visible range for vessels passing from the Sault around to the Keweenaw Peninsula. This improvement is now in contemplation.

1428. Eagle Harbor, Lake Superior, Michigan.—This is a fixed white light varied by white flashes, and is of the fourth order. It is one of great importance to large steamers passing from Duluth to the Sault. It should be at least of the second order in character. This improvement is now in contemplation.

1431. Eagle River, Lake Superior, Michigan.—The following recommendation, made in the Board's last annual report, is renewed:

> The moving of this light to Sand Hills, at a cost not to exceed $20,000, was authorized by the act approved February 15, 1893, but no appropriation therefor has yet been made. Recommendation is made that the amount named be appropriated. Various repairs were made.

1432. Portage Lake Ship Canals, Lake Superior, Michigan.—A change in color of the light and the height of the focal plane was made on September 26, 1896. The station was put in good repair.

Eleventh District.

1438. *Michigan Island, Lake Superior, Wisconsin.*—A landing crib was built and sunk in place 20 feet from shore. A crib was constructed at the shore and the two were connected by a bridge. New boat ways were built, resting on small cribs and extending from the shore to the boathouse. Various repairs were made.

1439. *La Pointe, Lake Superior, Wisconsin.*—The house was enlarged sufficiently for the accommodation of two keepers by raising the building and placing under it a brick basement. The rooms were rearranged to make two separate dwellings. A 60-foot skeleton metal tower was purchased under contract. Concrete foundations were placed, and the tower was erected as far as the level of the main deck. A brick oil house was built. Various repairs were made.

1440. *Chequamegon Point, Lake Superior, Wisconsin.*—The title papers to the site and right of way were recorded, the abstract of title was completed, and a certificate was obtained showing the consent of the legislature to the purchase. Concrete piers for the metal beacon were put in, the frame was raised, and studding, joists, and sheathing of the clock room of the tower were put up, the deck plate, railing, and the outside ironwork of the lantern were placed, and storm panes set. Work was closed on October 30, 1896, for lack of funds. The sundry civil appropriation act approved June 4, 1897, appropriated $1,500 for completing the work of moving and rebuilding the main La Pointe light and establishing a harbor bell and light at or near Chequamegon Point, Lake Superior, Wisconsin. Work will be undertaken at an early date.

NOTE.—The light was established October 11, 1897.

1442. *Devils Island, Lake Superior, Wisconsin.*—Material for the construction of a keeper's dwelling was obtained and transported by the tender *Amaranth* to the station. Boiler tubes and pipes and fittings were purchased for making repairs to the fog-signal plant. Plans and specifications for a cylindrical steel tower are being prepared.

1463. *Duluth Range (front), Lake Superior, Minnesota.*—A sewer was laid. The reservation fence at the rear of the keeper's dwelling and some 225 feet of the elevated walk were renewed. Two smokestacks were purchased to replace worn-out stacks on the fog-signal building. The fog-signal machinery was thoroughly overhauled. A Smith water heater was set up and connected with the boilers and tank, and tested. Duluth Range lights are both red lights of the fourth order; the rear light is flashing. These lights should be increased in power to at least the second order, and should be white flashing lights to distinguish them from the city lights, which lie back of them. These improvements are now in contemplation.

1465. *Two Harbors, Lake Superior, Minnesota.*—A part of the light-house site, lot No. 1, in block No. 6 of the village of Two Harbors, Minn., was, on July 27, 1896, sold at auction, after due advertisement. Various repairs were made.

1467. Grand Marais, Lake Superior, Michigan.—A contract was made for building the keeper's dwelling, which was completed in October, 1896.

1468. Isle Royale, Lake Superior, Michigan.—The landing was extended 16 feet, and the boatways 38 feet, resting on a crib. Various repairs were made.

1469. Passage Island, Lake Superior, Michigan.—An iron water tank was put up in the fog-signal house. The landing crib was extended. Minor repairs were made. This is a fixed red light of the fourth order. It should be at least of the third order, and it should be a flashing light in order to increase its visible range. This improvement is now in contemplation.

—. *Rock of Ages, Lake Superior, Michigan.*—The following recommendation, made in the Board's last annual report, is renewed:

> During the season of southerly and westerly winds many vessels bound to and from Duluth, by taking a course along the north shore of the lake and in lee of Isle Royale, are enabled to run when the lake is too rough for the more southerly course. A light and fog signal on the dangerous rocks off the westerly end of Isle Royale would be a valuable aid to these vessels. It is therefore proposed to establish a light and fog-signal station on the Rock of Ages, off the western end of Isle Royale. This it is estimated can be done for $50,000, and it is recommended that an appropriation of that amount be made therefor.

REPAIRS.

More or less extensive repairs were made at each of the following-named stations during the year:

1269. Bell Isle, Mich.
1270–1272. Windmill Point Range, Mich.
1277. St. Clair Flats Canal (lower), Mich.
1285. Lower No. 7, Herson Island, Mich.
1297. Sand Beach Harbor of Refuge (east entrance), Mich.
1299. Sand Beach Harbor of Refuge (north entrance), Mich.
1301. Port Austin Reef, Mich.
1314. Spectacle Reef, Mich.
1317. Bois Blanc, Mich.
1321. Cheboygan River Range (front), Mich.
1322. Cheboygan River Range (rear), Mich.
1348. Upper Lake George, Mich.
1392. North Entrance, No. 27, Little Rapids Cut, Hay Lake Channel, Mich.
1393. St. Marys Falls Canal, North Pier, Mich.
1394. St. Marys Falls Canal, South Pier, Mich.
1405. Grand Island Harbor, Mich.
1409. Marquette Breakwater, Mich.
1410. Granite Island, Mich.
1412. Huron Island, Mich.
1413. Stannard Rock, Mich.
1415. Portage River, Mich.
1424. Gull Rock, Mich.
1428. Eagle Harbor, Mich.
1429, 1430. Eagle Harbor ranges, Mich.
1433. Portage Lake Ship Canal Pierhead, Mich.
1436. Ontonagon Pierhead, Mich.
1437. Outer Island, Wis.
1441. Raspberry Island, Wis.
1443. Sand Island, Wis.
1444. Superior Pierhead, Wis.
1466. Two Harbors Breakwater, Minn.

Eleventh District.

LIGHT-VESSELS.

1274. Grossepoint light-vessel, No. 10, Lake St. Clair, Michigan.—She was taken from her station at the close of navigation, December 19, 1896, and was replaced on April 5, 1897. She received coal, wood, rations, stove castings, crockery, and general supplies. She is somewhat rotten in her upper works and deck, but it is hoped that she can remain on her station until the new lights are established in Lake St. Clair. The master is supplied with a number of buoys and sinkers, and has supervisory charge of the buoyage of the cut in addition to his present duties. He replaces a lost or damaged buoy in the absence of the tender.

1294. Lake Huron light-vessel, No. 61, at the foot of Lake Huron, Michigan.—She was taken from her station at the close of navigation, December 20, 1896, and was replaced on April 10, 1897. She received fuel, rations, crockery, stove castings, boat covers, general supplies, and grate bars for fog signals. Some slight repairs will put her in good condition.

—. Martins Reef light-vessel, northwestern end of Lake Huron, Michigan.—The following recommendation, made in the Board's last annual report, is renewed:

> It is proposed to place a light on Martins Reef, as an aid to the great and increasing traffic between the mouth of the St. Marys River and the Straits of Mackinac. Since the great development of steel works at Chicago, Milwaukee, and Joliet, and the discovery of new and cheap ores suitable for making steel on the northerly shore of Lake Superior, the commerce passing from the mouth of the St. Marys River through the Straits of Mackinac into Lake Michigan has increased with rapidity. It is several times greater than it was five years ago. The vessels carrying ore from Duluth and Two Harbors to Lake Michigan ports are the largest in the lake marine class. These vessels pass close to the dangerous Martins Reef, hence a light-vessel there is much needed. It is estimated that a proper light-vessel can be built and placed there for $15,000, and it is recommended that an appropriation of this amount be made therefor.

1318. Poe Reef light-vessel, No. 62, Straits of Mackinac, Michigan.—The illuminating apparatus is in good condition. The condition of the vessel herself and the service of the light and signal show a marked improvement over last year's work. She was taken off her station at the close of navigation, December 12, 1896, and replaced on April 20, 1897. She received fuel, stove castings, rations, crockery, general supplies, and grate bars for fog signals.

The following statement appeared in the Board's annual report for 1893:

> The establishment of a light-ship on this station, at a cost not to exceed $25,000, was authorized by the act approved February 15, 1893, but no appropriation therefor has yet been made. The Board recommends that the amount named be appropriated.

Eleventh District.

The following paragraphs appeared in the Board's annual report for 1894:

> No direct appropriation was made for this purpose, but Congress authorized, in the sundry civil appropriation act approved August 5, 1892, "that the appropriation of $60,000 heretofore made in the act approved August 30, 1890, for establishing a light-station at or near Eleven-Foot Shoal, off Point Peninsula, Michigan, be applied, under the direction of the Light-House Board, for the construction, or purchase, and equipment of one or more light-ships for service on the Great Lakes, and that said appropriation be made immediately available for such ships."

Thereupon three light-vessels were built from the appropriation named, one of which, No. 62, was placed off Poe Reef in September, 1893.

This vessel, while in fair condition, is not appropriate for so exposed a station. It is therefore proposed to take light-ship No. 62 off this station and use her as a relief light-vessel when she can be replaced by a new and more substantial vessel. A light-vessel suitable for this position can be built for $15,000, and it is recommended that an appropriation of this amount be made therefor.

FOG SIGNALS OPERATED BY STEAM OR HOT-AIR ENGINES.

1293. *Fort Gratiot, Michigan.*—This 8-inch steam whistle was in operation some 89 hours, and consumed about 7 tons of coal.

1294. *Lake Huron light-vessel, No. 61, Michigan.*—This 6-inch steam whistle was in operation some 101 hours, and consumed about 16 tons of coal.

1296. *Sand Beach Harbor of Refuge, north main light, Michigan.*—This 10-inch steam whistle was in operation some 185 hours, and consumed about 15 tons of coal.

1301. *Port Austin Reef, Michigan.*—This 10-inch steam whistle was in operation some 111 hours, and consumed about 10 tons of coal.

1309. *Thunder Bay Island, Michigan.*—This 10-inch steam whistle was in operation some 224 hours, and consumed about 19 tons of coal.

1312. *Presque Isle, Michigan.*—This 10-inch steam whistle was in operation some 267 hours, and consumed about 18 tons of coal.

1313. *Forty-Mile Point, Michigan.*—This 10-inch steam whistle, established April 30, 1897, was in operation some 107 hours, and consumed about 3 tons of coal.

1314. *Spectacle Reef, Michigan.*—This 10-inch steam whistle was in operation some 248 hours, and consumed about 22 tons of coal.

1315. *Detour, Michigan.*—This 10-inch steam whistle was in operation some 366 hours, and consumed about 24 tons of coal.

1316. *Round Island, Michigan.*—This 10-inch steam whistle, established October 20, 1896, was in operation some 81 hours, and consumed about 4 tons of coal.

1318. *Poe Reef light-vessel, No. 62, Michigan.*—This 6-inch steam whistle was in operation some 174 hours, and consumed about 30 tons of coal.

Eleventh District.

1319. Cheboygan, Michigan.—This 10-inch steam whistle was in operation some 299 hours, and consumed about 26 tons of coal.

1399. Point Iroquois, Michigan.—This 10-inch steam whistle was in operation some 370 hours, and consumed about 17 tons of coal.

1400. Whitefish Point, Michigan.—This 10-inch steam whistle was in operation some 477 hours, and consumed about 37½ tons of coal.

1408. Marquette, Michigan.—This 10-inch steam whistle was in operation some 454 hours, and consumed about 24 tons of coal.

1411. Big Bay Point, Michigan.—This 10-inch steam whistle, established October 20, 1896, was in operation some 85 hours, and consumed about 1½ tons of coal.

1412. Huron Island, Michigan.—This 10-inch steam whistle was in operation some 138 hours, and consumed about 8 tons of coal.

1413. Stannard Rock, Michigan.—This 10-inch steam whistle was in operation some 281 hours, and consumed about 18 tons of coal.

1423. Manitou, Michigan.—This 10-inch steam whistle was in operation some 449 hours, and consumed about 26 tons of coal.

1428. Eagle Harbor, Michigan.—This 10-inch steam whistle was in operation some 487 hours, and consumed about 38 tons of coal.

1433. Portage Lake Ship Canals Pierhead, Michigan.—This 10-inch steam whistle was in operation some 591 hours, and consumed about 33 tons of coal.

1434. Fourteen Mile Point, Michigan.—This 10-inch steam whistle was in operation some 96 hours, and consumed about 6 tons of coal.

1437. Outer Island, Wisconsin.—This 10-inch steam whistle was in operation some 208 hours, and consumed about 17 tons of coal.

1439. La Pointe, Wisconsin.—This 10-inch steam whistle was in operation some 467 hours, and consumed about 26 tons of coal.

1442. Devils Island, Wisconsin.—This 10-inch steam whistle was in operation some 223 hours, and consumed about 11 tons of coal.

1444. Superior Pierhead, Wisconsin.—This 6-inch steam whistle was in operation some 555 hours, and consumed about 32 tons of coal.

1463. Duluth, Minnesota.—This 10-inch steam whistle was in operation some 692 hours, and consumed about 33 tons of coal.

1465. Two Harbors, Minnesota.—This 10-inch steam whistle was in operation some 637 hours, and consumed about 38 tons of coal.

1469. Passage Island, Michigan.—This 10-inch steam whistle was in operation some 396 hours, and consumed about 24 tons of coal.

The Board has in contemplation supplying steam heaters at an early date for the steam fog signals at Thunder Bay Island, Presque Isle, Spectacle Reef, Detour, Point Iroquois, Whitefish Point, Stannard Rock, Manitou, Eagle Harbor, Two Harbors, Passage Island, and other stations, in order to facilitate a quicker operation of the fog signals at the more important points.

Eleventh District.

BUOYAGE.

The buoyage in the St. Clair and St. Marys rivers, the Portage district, and in Duluth-Superior harbors, has been efficiently cared for, and an effective daily patrol has been made during the whole of the open season of 1896 and thus far in 1897. The Duluth service has been greatly improved by the new contractor, and the system of supervision and inspection by the neighboring light-keeper. The buoyage of Lake St. Clair has been attended to by the tender *Marigold*, with the local supervision of the master of the Grossepoint light-vessel. The floats in Hay Lake Channel have been looked after by the tender *Marigold*. A special arrangement was made with local people for removing or replacing them. A marked economy has resulted from this arrangement.

DEPOT.

Detroit, Mich.—Plans, specification, and estimate of cost for rebuilding and enlarging the engineer storehouse were made. The material was purchased by contract and work was commenced. The storehouse was completed in May. The front sidewalk on Wight street was raised to grade and crossings to curbstone made opposite each gate, the iron fence was overhauled, raised, and repaired from Wight street to new location of gate on Mount Elliot avenue, and a new board fence was built from the dock to the corner of the storehouse. Various repairs were made.

Light-house and buoy depot for the Eleventh light-house district.—The only depot for this large and important district is now at Detroit, at the extreme southern end of the district. Recent improvements in the channels through St. Marys River have made necessary a large increase in the aids to navigation in that vicinity. The registered tonnage which passed through the Sault Canal last year was 17,249,418 tons. The freight tonnage was 16,239,061 tons. It is estimated that but 4 per cent of the freight was Canadian. The estimated value of the American craft which passed through the Sault Canal is $43,006,200. The estimated value of the total freight carried through the canal in 1896 is $195,146,842. The increase in freight values carried in the year previous to 1896 is $36,000,000. The estimated increase in freight values carried in the past nine years is $121,000,000. These figures are from the annual report of the United States engineer in charge of the Government works connected with the Sault Canal. There are in the Eleventh light-house district 178 light-houses and lighted beacons, 3 light-vessels in position, 18 post lights, 29 steam fog signals, 376 buoys of all kinds in position, and a third of that number in store. The district consists of Lake Huron, which is about 250 miles long; Lake Superior, which is about 400 miles long, without mentioning Lake St. Clair and River, and the connecting St. Marys River and Canal.* In the interests of economy a large supply of coal sent from the Erie ports should be stored in a light-house depot near the entrance to the Sault Canal for use at the steam fog signals on Lake Superior. The important and constantly increasing buoyage in Lake Superior, the ship canal at Portage River and St. Marys River, demand that a large supply of light-house material be stored near St. Marys River. It is estimated that a depot can be established in this vicinity for not exceeding $15,000, and it is recommended that an appropriation of this amount be made therefor.

TENDERS.

The Marigold.—This iron-screw steamer was actively employed from the opening of navigation, 1897. She steamed about 12,314 miles, and consumed some 860 tons of coal. In addition to her usual work she was employed in delivering coal to fog-signal stations. The vessel was docked and thoroughly cleaned and painted in March, 1897. An electric-lighting plant and a steam-steering apparatus were installed with satisfactory results. A new propeller was shipped on May 10, 1897, she having lost a blade of the old one in service. The hull, boiler, and machinery generally are at present in good condition.

The Amaranth.—This steel-screw steamer was employed during July, August, September, and October, 1896, in delivering material for repairs at Round Island, Portage Lake Ship Canal, St. Clair Flats Canal, Sturgeon Point, Thunder Bay Island, Church Point, Whitefish Point, Stannard Rock, Manitou, Pointe aux Barques, Detour, and Passage Island light stations, in delivering material for construction at Forty-Mile Point, Big Bay Point, Chequamegon Point, and Grand Marais light stations, and carrying to the Detroit light-house depot worn-out fog-signal boilers, machinery, etc., from Whitefish Point and Detour light-stations, and tools and appliances from Forty-Mile Point light-station. Ship chandlery, paints and oils, hardware, crockery, dry goods, and furniture required during the season of 1897 were purchased after due advertisement. The tender was in winter quarters at the Detroit light-house depot from November, 1896, to April, 1897. The woodwork of the cabin was repainted, repairs were made to the floor sections in the mast hold, new ventilators were placed in the stokehole, a new floor was laid in the afterhold, new iron deck beams were put in the aftercabin, the heaters were bronzed, and the whaleboat was repaired. The fantail, and all new work in the cabin, new spar, bottom of launch, whaleboat, inside of the pilot house, and the hull of the tender were painted. A new spar was provided, and the spar deck was repaired. The tender went into commission in April, 1897, and the steam barge *Warrington* was towed to the dry dock for repairs. A trip was made to Lake St. Clair to locate the site of the pile clusters and to take lumber to and locate Russell Island beacon. The *Amaranth* was employed during May and June in delivering material for repairs at Spectacle Reef, Presque Isle, Thunder Bay Island, Manitou Island, Gull Rock, Mendota, Huron Island, Portage Lake Ship Canal, Fourteen-Mile Point, Michigan Island, and Big Sable light-stations, and material for construction at Portage Lake and River and Big Sable light-stations. She delivered 2,125 tons of material, steamed some 9,934 miles, and consumed about 730 net tons of bituminous coal. The total mileage made by the tender for both the Ninth and Eleventh districts was about 11,684 miles, on a consumption of some 898 net tons of coal. She consumed 120 tons of coal in winter quarters.

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* The American shore line of the Great Lakes and their connecting rivers (which are within the limits of the Ninth, Tenth, and Eleventh light-house districts) if measured in steps of 25 miles is about 3,000 miles, but if the indentations of the shore and the outlines of the islands be included the developed shore line is about 4,700 miles in length. (See Annual Report of the Chief of Engineers for 1875, part 2, page 857.)

A new cover for the steam chest was provided and fitted for the *Amaranth's* launch, the oil cups were repaired, and a new four-blade propeller wheel was provided. She was used during May and June, 1897, in the construction of Portage Lake and River lights, Michigan.

The Warrington.—This steam screw barge received extensive repairs. Contracts were made for rebuilding and renewing the hull and for providing a new boiler and refitting and altering the engine. The contractors put the boat in the dry dock on April 24, 1897. The contract for repairing the hull was completed, and the boat was delivered at the light-house depot dock. During June, 1897, the contractor for repairs to the engine and machinery and new boiler completed the boiler, ready for testing. The boat is practically new up to and including the main rail and bulwarks. Steps are being taken for repairs to the upper works and completion of the boat.

Scow lighter.—The scow lighters were thoroughly recalked and painted.

Launch Lotus.—This launch has not been in use since the construction of Hay Lake Channel lights. She is a good boat for similar constructions, but should have considerable repairs to make her thoroughly seaworthy.

TWELFTH DISTRICT.

This district extends from the boundary between California and Mexico to the boundary between California and Oregon. It embraces all aids to navigation on the seacoast, bays, rivers, and other tidal waters of California.

Inspector.—Commander Frank Courtis, United States Navy.

Engineer.—Maj. Charles E. L. B. Davis, Corps of Engineers, United States Army.

There are in this district—

Light-houses and lighted beacons, including 3 post lights	39
Day or unlighted beacons	54
Lighted beacons used also as day marks	16
Fog signals operated by steam	15
Fog signals operated by clockwork	8
Fog signal operated by hand	1
Whistling buoys in position	12
Bell buoys in position	9
Other buoys in position	68
Steamer *Madroño*, buoy tender, and for supply and inspection	1
Steam launch of *Madroño*	1
Steam launch *Hazel*, for construction and repairs	1

NOTE.—The number preceding the name of a light-station in the Twelfth and Thirteenth districts is that by which it is designated in the List of Lights and Fog Signals on the Pacific Coast of the United States, corrected to April 1, 1897.

LIGHT-STATIONS.

985. Point Loma, entrance to San Diego Bay, California.—The barn was moved from the windward side of the dwelling to a more suitable site. Three tanks, in which the water for the supply of this station is stored, were covered in with slight wooden structures to protect the water from evaporation by the heat of the sun. Minor repairs were made.

992. Point Hueneme, entrance to Santa Barbara Channel, California.—The following statement was made in the Board's annual report for 1894:

> As the efforts made to secure a right of way to and from this station for any reasonable price, under the appropriation of $250, have failed, it is proposed, as was stated in the Board's last annual report, to obtain it by condemnation. It is estimated that this will cost not exceeding $3,000. It is recommended, therefore, in view of the great necessity for the road, that an appropriation of $3,000 be made for this purpose.

The Board renews and urges this recommendation.

993. Santa Barbara, Pacific Ocean, on a point 2 miles southeast of Santa Barbara Landing, California.—A fence was built along the western side of the reservation and a short fence with a gate was placed across the roadway at the entrance to the grounds. The water tank was housed in to prevent evaporation of the water and injury to the tank by heat. Minor repairs were made.

The following recommendation, made in the Board's annual report for 1894, is renewed:

> The light-house at this station was built in 1856. It is of brick with the outer wall stuccoed. The light is shown from an old-fashioned lantern with triangular-shaped glass, built on top of the dwelling. The structure is unsightly and uncomfortable, and in winter the walls are damp. To put this building in good repair would cost as much, if not more, than to build a new modern structure. This can be done, it is estimated, for not exceeding $7,500, and it is recommended that an appropriation of that amount be made therefor.

994. Point Conception, entrance to Santa Barbara Channel, California.—The pipe line from the spring, where it ran along the face of the cliff, was broken by falling rocks. It was repaired and about 300 feet of the overhanging bluff were removed for 60 to 70 feet back from the edge, involving the removal of 2.500 cubic yards of rock. Minor repairs were made.

—. *Point Arguello, about 12 miles northwest of Point Conception, seacoast of California.*—The following recommendation, which appeared in the Board's annual report for the last eight years, is renewed:

> This point is about 12 nautical miles to the northward and westward of Point Conception. It is reported to be one of the foggiest places on the Pacific coast. In consequence of the sharp bend in the coast, the outlying rocks, and the almost constant fog that prevails, Point Arguello is one of the most important points on the coast at which a light and fog-signal station should be established. The United States already owns the site which is deemed most suitable for the buildings. It is therefore estimated that the work can be done at a cost not to exceed $35,000, and it is recommended that an appropriation of this amount be made therefor.

—. *Point Buchon, about 8 miles northwest from Point San Luis Obispo, California.*—The following recommendation, which was made in several previous annual reports, is renewed:

> This point is in San Luis Obispo County, and is 17 miles distant from the town of San Luis Obispo by wagon road and trail. The nearest light-house is Piedras Blancas, about 30 nautical miles to the northward and westward. The point is prominent, and with its outlying rocks is very dangerous to navigators close inshore during a fog, especially as vessels going to and from Port Harford make a sharp turn just off this point. It is estimated that a light-house and fog signal can be erected at this point for $33,000.

997. Point Sur, seacoast of California.—The drinking water, supplied from springs, was unfit for domestic purposes. A 20,000-gallon tank was therefore erected back of the dwelling and pipes were arranged to conduct to it the water caught on the roofs. The trestles and bridges on the line of the railway were renewed, the track was straightened, and the hoisting engine was placed on a timber and concrete foundation. The accommodation for the four keepers is insufficient. The recommendation made in the last annual report, that an appropriation of $6,000 be obtained to build a new cottage, is renewed. But as the matter was somewhat urgent, the old quarters of the superintendent of construction, since used by an assistant keeper, were remodeled, repaired, and enlarged to render them habitable pending the time when funds may be available for the new cottage. Various repairs were made.

998. Point Pinos, entrance to Monterey Bay, California.—The following recommendation, which was made in the Board's annual report for the last eight years, is renewed:

> The plat of land owned by the Government at this station does not touch the sea at any point on its boundary line. For convenience in landing stores and supplies it is essential that the United States should own the strip of land between the light-house lot and the seacoast. The owners have offered to sell the land desired for $2,000, and the Board recommends that an appropriation be made for its purchase.

1000. Año Nuevo Island, seacoast of California.—A landing wharf for small boats was built by the keeper, mostly with lumber collected on the beach. A small quantity was furnished to him. Various repairs were made.

1001. Pigeon Point, extreme end of Pigeon Point, Pacific Ocean, California.—A fence was built around the reservation, and walks were put down. Some 8,240 feet of lumber and 320 posts were used. Various repairs were made.

The following recommendation, made in the Board's last three annual reports, is renewed:

> There are standing, outside of the light-house site, but close to the fence inclosing the light-house structures, a fisherman's shanty and a hay barn. If a fire should break out in either of these buildings, it would endanger the structures of the light station. It is proposed, in order to obviate this danger, that an additional strip of land to the eastward of the station, say 150 feet wide, be purchased and added to the light-house reservation. This it is estimated can be done for not exceeding $5,000, and it is recommended that an appropriation of this amount be made therefor.

1002. Point Montara fog-signal station, seacoast of California.—The sounding-board placed back of the fog whistles was found to be too small, much of the sound passing landward over it. A new sounding-board, 12 feet high, extending over three-quarters of the length of the roof, was erected and securely fastened to the ridge with bolts and brace rods. Various repairs were made.

1003. Farallon Island, off the entrance to San Francisco Bay, Pacific Ocean, California.—The old tramway leading from the north landing to the dwellings and fog signal was torn up and a new one was built and graded with sand from the beach. It was carried across gulleys and ravines on trestles and bridges, extended to the south landing, which was built last year. It is 3,559 feet long. The call-bell system, destroyed by lightning on February 18, 1897, was repaired and two lightning arresters were put in to prevent a recurrence of the accident. As this station has of late years frequently been struck by lightning, the lightning rod was reestablished. A copper spindle, surmounted by a platinum point, was placed on the cowl of the lantern, with a copper-wire rope leading down the roof and one of the dividing strips of the lantern to the gallery, thence down the side of the tower to the earth, where it was grounded at two places by being fastened to two car wheels sunk in the rock 20 and 40 feet from the base of the tower. Minor repairs were made.

1005. Bonita Point, entrance to San Francisco Bay, California.—A stable was built to replace an old structure which had been destroyed because it had been occupied by a glandered horse. A fence was built to separate the light-house grounds from the rest of the military reservation. Various repairs were made.

1006. Fort Point, San Francisco Bay, California.—The keepers built concrete walks around the dwellings with material furnished them. A tramway is being built, leading from the road at the base of the hill to the dwellings on top. Various repairs were made.

1007. Lime Point fog-signal station, San Francisco Bay, California.—The water supply was improved by erecting a 15,000-gallon tank and conveying water into it from springs on the hillside. One of the old engines formerly used at Northwest Seal Rock light station was installed to aid in landing supplies.

1008. Angel Island fog-signal station, San Francisco Bay, California.—A fence was built around the dwelling, and the yard in front was covered with concrete. A small frame storehouse was built at the base of the hill to replace one carried away by a landslide. Various repairs were made.

—. *Quarry Point, Angel Island, San Francisco Bay, California.*—The following recommendation, made in the Board's last five annual reports, is renewed:

> Various petitions were received from those representing marine interests asking that a fog signal be established at this point. The passage between the eastern side of Angel Island and Southampton Shoal is quite narrow. The strong tides setting in and out through the Golden Gate have full force on a vessel bound up or down the bay, and in the case of ships being towed, as so many are, past this point, the set of the current is enough to make it hazardous, there being danger either of running aground on Southampton Shoal or Angel Island. An enormous quantity of shipping annually passes this point, bound to and from the great grain wharves at Port Costa, the Sacramento and San Joaquin rivers, and Mare Island Strait. Hundreds of the largest sailing ships are towed from San Francisco to Port Costa, where they load with grain, and are then towed down and out to sea. In this way there is more shipping passing through these waters than anywhere else in the district, except through the Golden Gate. There have been a number of casualties in the vicinity of this point.
>
> Among many were the following:
>
> The ferry steamer *Contra Costa*, plying between San Francisco and San Quentin with passengers, ran ashore near California City.
>
> The ship *E. B. Sutton*, while being towed down from Port Costa, ran ashore near Quarry Point, Angel Island.

Twelfth District.

The ship *Eleanor Margaret*, bound to Port Costa, ran ashore on Bluff Point, Raccoon Straits.

The ship *Maulsden*, while being towed to Port Costa, ran ashore on Southampton Shoal.

Mariners have asked that Quarry Point be selected for the fog-signal station, because, to make a start upriver in a fog, it is necessary to make Angel Island to get a departure. After careful examination the Board reached the conclusion that a fog signal at this locality would be a decided aid to mariners. In view of the great economy of establishing and maintaining a large fog bell here instead of a steam fog signal, it decided in favor of the former. It is estimated that it will cost $6,000 to establish this fog bell, and it is recommended that an appropriation of this amount be made therefor.

1009. Alcatraz Island, San Francisco Bay, California.—The kitchens were rebuilt and raised to provide a room above them, and an outside stairway was put up. Latticework and fences were built around the yard, and the unsightly outhouse, etc., were removed to make the light-house grounds conform in neatness to the military post in which it is situated.

1010. Yerba Buena, San Francisco Bay, California.—As the room afforded by the dwelling was insufficient for the two keepers and their families, a room was built in the ell between the front and rear portions. Various repairs were made.

1011. Oakland Harbor, entrance to Oakland Harbor, California.—The contractor completed the improvements. Eight piles were driven on the northern side of the existing building, and on this foundation two rooms were built, and the gallery was extended around the entire building. A 4,000-gallon tank was placed on the north side, and the 1,000-gallon tank, which formerly stood on the south side, was taken down, as it seemed to interfere with the sound of the fog bell. Landing steps were built. The structure carrying the red light marking the southern entrance to the jetties was protected from passing vessels by driving three clusters of three creosoted piles each on the bay and channel sides.

1016. Mare Island, entrance to Karquines Strait from San Pablo Bay, California.—A fence was built along the roadway to the station and from the end of the reservation to the bluff. A ladder and 100 feet of 1-inch fire hose were supplied. Various repairs were made.

1017. Roe Island, Suisun Bay, California.—A small frame building was built to inclose the water tank.

—. *New York Slough, entrance to San Joaquin River, California.*—The following recommendation, made in several previous annual reports of the Board, is renewed:

> The establishment of a light and fog signal here, at a cost not exceeding $10,000, was authorized by the act approved February 15, 1893, but no appropriation therefor has yet been made. The Board recommends that the amount named be appropriated.

1022. Point Arena, seacoast of California.—The fog-signal house was completed in August, 1896, and the fog-signal apparatus was moved into it. It stands 125 feet back from the site of the old building, and is thought to be secure from the inroads of the sea. Various repairs were made. A wire screen was erected on the north side of the lantern to protect it from flying wild fowl. A fence 315 rods long was built along one side of the road. Although this road passes through land belonging to private parties, by the terms of the deed of right of way, the fencing belongs to and must be kept up by the Government.

1023. Cape Mendocino, on the western extremity of Cape Mendocino, California.—The roadway from the county road was completed. It is higher up the hill than the old road and reaches the station over an easier grade. The dwelling completed last year is smaller than the old building. As the accommodations for the keepers are insufficient, one family is compelled to occupy a structure formerly used as an oil house. The following recommendation made in the Board's last annual report is therefore renewed:

> The plans approved by the Board contemplated the construction of an additional cottage for the assistant keeper. It is estimated that a proper structure can be erected for $5,500, and it is recommended that an appropriation of that amount be made therefor.

—. *Humboldt Entrance Range beacon lights, entrance to Humboldt Bay, California.*—The jetties are nearly finished. When they are completed, it will only be necessary to provide proper lights to enable steamers to enter and leave the port of Eureka, in Humboldt Bay, during the night, except during fog. There are now no lights at this port, although many steamers arrive and leave each week. It is proposed to establish six beacon lights there, at small expense, and to pay for them from the general appropriation. They will be called the Humboldt Bay Entrance Range beacon lights. The front light will be red; the rear light will be white; the North Jetty beacon light will be white; the Humboldt beacon light No. 1 will be white; the Brosnans Wharf beacon light will be red, and the Clark Slough beacon light No. 6 will be red. They will consist of lanterns hung on poles.

NOTE.—These lights were established on July 5, 1897.

1026. Crescent City, seacoast of California.—The light-house reservation consisted of 10 acres on the mainland, the island on which the light-house stands, and the reef of rock connecting them. The mainland portion was of no use to the Light-House Establishment, and being occupied by squatters was only a source of annoyance to the Government. It was therefore decided to sell the property in such subdivisions as would give the several squatters the opportunity to purchase their holdings if they so desired. The property was divided into several parcels and on November 19, 1896, was sold at public auction. The island and reef of rocks were reserved, as was also the right of way over all streets which by the terms of the sale the purchasers were required to open as laid off on the plat of the city of Crescent City.

Twelfth District.

1027. St. George Reef, on Northwest Seal Rock, off Crescent City, seacoast of California.—Two fog-signal boilers were purchased and set up in place of the old ones, which had been condemned.

REPAIRS.

During the fiscal year repairs and renovations more or less extensive were made at the following-named stations:

991. Point Fermin, Cal.
992. Point Hueneme, Cal.
995. San Luis Obispo, Cal.
996. Piedras Blancas, Cal.
998. Point Pinos, Cal.
999. Santa Cruz, Cal.
1015. East Brother Island, Cal.
1021. Point Reyes, Cal.
1024. Humboldt, Cal.
1025. Trinidad Head, Cal.

LIGHT-VESSELS.

1004. San Francisco Harbor light-vessel No. 70, off San Francisco Bar, California.—This vessel is being built at Portland, Oregon. An appropriation of $40,000 was made by the act approved June 4, 1897, for her completion. Contract was made after due advertisement on January 23, 1897, with the lowest bidder to deliver the vessel in November, 1897. The work is well advanced. She has a steel frame, steel keelplate, steel bilge strake, and steel sheer strake connected by diagonal plates from keel to sheer strake, and is wood planked from the keel up to the sheer line at the main deck, and from that point up to the spar deck is plated with steel plate. She is 112 feet long, 28½ feet broad, and 22 feet 1½ inches deep, and is capable of moving with her own steam power. Her main engine is of the vertical, inverted surface-condensing type, with a single cylinder of 22 inches diameter and with 22 inches of piston stroke, and has 350 indicated horsepower. Her screw propeller is about 8 feet in diameter and has 4 blades with pitch and area for an estimated speed of 8 knots. Her main boiler is cylindrical and single-ended, 12 feet 2 inches in diameter and 11 feet 3 inches long. She also has donkey boilers and engine, and is fitted with a distilling apparatus. Her electric plant consists of two 4-inch double-cylinder engines with suitable generators, and are intended not only to thoroughly light the interior of the ship, but to run the flashing electric lights at the two mastheads. Her fog-signal machinery consists of a horizontal noncondensing steam engine about 5 inches diameter of cylinder and 6 inches stroke, able to make about 120 revolutions a minute, and is attached to the machinery for operating the Crosby steam chime whistle. Her gross tonnage under the main deck is about 350 tons. Her speed will probably be about 8½ knots.

Relief light-vessel for the Twelfth and Thirteenth light-house districts (Pacific Coast).—There are now three light-vessels stationed at important points on the Pacific Coast, one in the Twelfth and two in the

Thirteenth light-house districts. If it becomes necessary to temporarily withdraw any one of these vessels, there is no relief light-vessel to replace it. Such a vessel is urgently needed. It is estimated that one can be built for not exceeding $80,000, and it is recommended that an appropriation of this amount be made therefor.

DAY OR UNLIGHTED BEACONS.

Beacon No. 4, San Diego Bay, California.—A 4-pile beacon crowned with a box, painted red, and marked by a figure "4" in white. This beacon was rebuilt by contract, and was completed on March 25, 1897.

Anita Rock Spindle, San Francisco Bay, California.—This iron spindle, upset on February 13, 1895, was recovered, repaired, and replaced by contract in its old position on July 13, 1897. The top of the cage is 30 feet above the rock, and the top of the rock is bare at low water. The first-class nun buoy placed to mark this rock after the destruction of the spindle will be removed.

Eight beacons in Alviso Channel were set up on October 21, 1896, at a cost of $140 each. At the same time the spar buoys there were discontinued.

Lower end San Joaquin Middle Ground beacon, mouth of San Joaquin River, California.—A 3-pile beacon crowned with a box, painted red, and marked with the figures "10" in white was rebuilt in December, 1896.

Mile Rock, San Francisco Bay, California.—Experiments were made to determine the practicability of establishing a bell struck by electricity as a fog signal on this rock. As the rock is exposed to the full force of the sea at the entrance to the harbor, it is impracticable to place any machinery on it. The plan most favored contemplates a station on shore in which a small dynamo run by a gasoline engine can be installed, with a device for opening and closing the circuit, the current to be carried by heavily insulated armored cables to the rock, where it is to excite the solenoid which operates the striker of the bell.

Beacon No. 10, Suisun Bay, was rebuilt.

Twelve piles, the remains of old beacons, which were dangerous to navigation in San Diego Bay, were removed.

FOG SIGNALS OPERATED BY STEAM.

994. Point Conception, California.—The 12-inch steam whistles, in duplicate, were in operation some 272 hours, and consumed about 28 tons of coal.

995. San Luis Obispo, California.—The 10-inch steam whistles, in duplicate, were in operation some 1,318 hours, and consumed about 84 tons of coal.

Twelfth District.

997. Point Sur, California.—The 12-inch steam whistles, in duplicate, were in operation some 908 hours, and consumed about 79 cords of wood.

1000. Año Nuevo Island, California.—The 12-inch steam whistles, in duplicate, were in operation some 854 hours, and consumed about 51 tons of coal.

1001. Pigeon Point, California.—This signal, consisting of one 10-inch and one 12-inch steam whistle, was in operation some 739 hours, and consumed about 69 cords of wood.

1002. Point Montara, California.—The 12-inch steam whistles, in duplicate, were in operation some 600 hours, and consumed about 84 cords of wood.

1003. Farallon, California.—The first-class steam siren, in duplicate, was in operation some 962 hours, and consumed about 66 tons of coal.

1005. Bonita Point, California.—The first-class steam siren, in duplicate, was in operation some 1,286 hours, and consumed about 109 tons of coal.

1007. Lime Point, California.—The 12-inch steam whistles, in duplicate, were in operation some 668 hours, and consumed about 73 tons of coal.

1010. Yerba Buena, California.—The 10-inch steam whistles, in duplicate, were in operation some 52 hours, and consumed about 9 tons of coal.

1015. East Brother Island, California.—The 12-inch steam whistle was in operation some 117 hours, and consumed about 11 tons of coal.

1021. Point Reyes, California.—The 12-inch steam whistles, in duplicate, were in operation some 982 hours, and consumed about 77 tons of coal.

1022. Point Arena, California.—This signal, consisting of one 10-inch and one 12-inch steam whistle, was in operation some 1,386 hours, and consumed about 143 cords of wood.

1024. Humboldt, California.—This signal, consisting of one 10-inch and one 12-inch steam whistle, was in operation some 802 hours, and consumed about 77 cords of wood.

1027. St. George Reef, California.—The 12-inch steam whistles, in duplicate, were in operation some 818 hours, and consumed about 45 tons of coal.

BUOYAGE.

The buoyage of the district is in excellent condition and all buoys are in place. On July 11, 1896, the bell buoy attached to a first-class can buoy marking Mile Rocks, entrance to San Francisco Bay, was replaced by an improved first-class bell buoy. The ordinary bell buoy was built up one course higher and has given satisfaction. On September 29, 1896, the San Francisco Bar whistling buoy was damaged by a collision, but it was replaced the next day. On November 23, 1896, this buoy was again disabled, as its whistle was damaged by collision. Owing to the absence of the tender, the whistle was not replaced until November 29, 1896. On January 6, 1897, the bell buoy marking Souza Rock, San Luis Obispo Bay, California, was disabled; it was placed in good working order again on January 19, 1897. On February 24 a black bell buoy, was placed, in 84 feet of water, in line with and about three-fourths of a mile from the outer end of the north jetty, Humboldt Bay. On April 18, 1897, a black bell buoy, marked "M. R.," in white, was placed, in 39 feet of water, to mark Mouse Rock, entrance to Cayucos Landing, Estero Bay. The can buoy formerly marking this rock was removed. On June 19, 1897, the Humboldt Bar whistling buoy was moved to a position, in 93 feet of water, 1¼ miles N. by E. ¾ E. from its former position, to conform to the channel, which has made to the northward owing to the progress of the work on the jetties.

WHISTLING BUOYS IN POSITION.

San Diego Bar, California.—A second-class whistling buoy, painted black and white perpendicular stripes and marked "S. D."

Point Arguello, California.—A second-class whistling buoy, painted red and marked "Pt. A."

Point Buchon, California.—A second-class whistling buoy, painted red and marked "Pt. B."

Piedras Blancas, California.—A second-class whistling buoy, painted red and marked "P. B."

Point Pinos, California.—A second-class whistling buoy, painted red and marked "Pt. P."

Santa Cruz, California.—A second-class whistling buoy, painted black and white perpendicular stripes and marked "S. C."

San Francisco Bar, California.—A first-class whistling buoy, painted black and white perpendicular stripes and marked "S. F."

Saunders Reef, California.—A second-class whistling buoy, painted red and marked "S. R."

Fort Bragg Landing, California.—A second-class whistling buoy, painted black and white perpendicular stripes and marked "F. B."

Blunts Reef, Cape Mendocino, California.—A second-class whistling buoy, painted red and marked "Blunt."

Humboldt Bar, California.—A second-class whistling buoy, painted black and white perpendicular stripes and marked "H. B."

Crescent City, California.—A second-class whistling buoy, painted black and white perpendicular stripes and marked "C. C."

NOTE.—A whistling buoy was on July 29, 1897, established in about 90 feet of water, some 2 miles SSE. of the lighthouse off Point Hueneme, California.

Twelfth District.

BELL BUOYS IN POSITION.

San Diego Bar, California.—A first-class bell buoy, painted black and white perpendicular stripes and marked "S. D."

San Pedro Bay, California.—A first-class bell buoy, painted red and black horizontal stripes, and marked "S. P."

San Luis Obispo Bay, California.—A first-class bell buoy, painted red and black horizontal stripes and marked "S. L."

Mouse Rock, Estero Bay, California.—A first-class bell buoy, painted black and marked with the letters "M. R." in white, was established on April 18, 1897.

Noonday Rock, California.—An improved first-class bell buoy, painted red and black horizontal stripes and marked "Noonday Rock."

Mile Rock, California.—A first-class bell buoy, painted red and black horizontal stripes.

Point Arena, California.—A first-class bell buoy, painted black and white perpendicular stripes and marked "Pt. Arena."

Humboldt Bar, California.—A first-class bell buoy, painted black.

Crescent City, California.—A first-class bell buoy, painted black and marked "C. C."

DEPOT.

Yerba Buena Island.—The blacksmith's and watchman's quarters, which were in a small building originally built as a storehouse, were enlarged by the addition of two rooms built on in front, and both the addition and old structure were set on masonry foundations. A combined pump house and blacksmith shop was built to replace the old one, which was small and dilapidated. The new building was arranged to receive the new duplex steam pump and its boiler recently purchased. Various repairs were made. A contract was let for the construction of a new wharf. The work was begun in March, 1897. At the end of the year the foundation of the retaining wall was all in place and the wall proper nearly completed, the iron piling was driven, and the placing of the superstructure begun, the storehouses had been raised, braced, and floored, and the stone filling was as far advanced as was practicable until the retaining wall is finished and well set.

TENDERS.

The Madroño.—This iron screw steamer attended to the buoyage, supply, and inspection of the district.

She changed or replaced 105 buoys, painted or repaired 19 beacons, landed some 743 tons of coal at 23 stations, delivered supplies at 35 stations, conveyed the inspector to all the stations except Cape Mendocino and Humboldt, which are visited by other means of conveyance, making 169 inspections during the year. In doing this she steamed about 8,401 miles upon a consumption of some 816 tons of bituminous coal. The crew were employed at the depot 1,658 hours, and the vessel was laid up 38 days for repairs to hull and machinery.

The *Madroño* was docked on August 31, 1896, and again on June 1 1897, and after a thorough cleaning received two coats of an antifouling composition. The ship's boats and rigging are in fairly good condition.

The Madroño's steam launch.—This launch, which is used to communicate with the light-house depot on Yerba Buena Island and for distributing supplies to harbor stations, is in good condition. During the year her condenser was renewed twice, the low-pressure piston repaired, and a new copper stem band furnished.

Steam launch Hazel.—This launch was employed by construction parties at the various bay light stations. She was taken twice from the water, scraped, painted, and slightly repaired, to keep her in good condition.

13

THIRTEENTH DISTRICT.

This district extends from the boundary between California and Oregon to the northern boundary of the United States, and includes Alaska. It embraces all aids to navigation on the seacoasts of Oregon and Washington, and the United States waters of the Strait of Juan de Fuca, Washington Sound, and the Gulf of Georgia, and on the tidal waters tributary to the sea, strait, sound, and gulf between the limits named, together with those on Alaskan waters.

Inspector.—Lieut. Commander John P. Merrell, United States Navy.

Engineer.—Capt. Walter L. Fisk, Corps of Engineers, United States Army.

There are in this district—

Light-houses and beacon lights, including 94 post lights	127
Light-vessel in position	1
Day or unlighted beacons	44
Fog signals operated by steam or hot-air engines	12
Fog signals operated by clockwork	5
Whistling buoys in position	8
Bell buoys in position	5
Other buoys in position	270
Steamer *Manzanita*, buoy tender, and for supply and inspection	1
Steamer *Columbine*, for construction and repairs	1

LIGHT STATIONS.

1028. Cape Blanco, seacoast of Oregon.—The road leading from the county road to the station, which was almost impassable on account of washouts, was repaired. The quarters are insufficient for the three keepers. They can not be added to or altered to meet the needs of the station. It is estimated that a suitable new building can be erected for not exceeding $4,500, and it is recommended that an appropriation of that amount be made therefor.

1029. Coquille River, seacoast of Oregon.—The stone foundation of the light and fog-signal building was covered with a coating of cement mortar of about one-half inch in thickness. A new shade and guide rods for the occulting apparatus were made and put in place, and the fog-signal apparatus was overhauled. A fence of barbed wire was built around the boundary line of the station to protect the scant vegetation now growing; also around the barn a space of 75 by 100 feet was inclosed with a fence with galvanized netting for a cow yard and poultry. An oil house was constructed. The foundation of the barn was rebuilt and protected. The wire of the electric call bells was changed from the front to the rear of the dwelling. A closet of cedar was built in the fog-signal room. Storm doors were made and put on the dwelling and a light stepladder was made for use in the lantern. Two new furnaces were purchased and will be put in place during the coming season.

1030. Cape Arago, on a small island at the western end of Cape Arago, seacoast of Oregon.—The work of putting in the fog-signal machinery was completed and the apparatus started on September 16, 1896, since when it has been in continuous service. There is here a little wooden oil house, but since the establishment of a fog signal it is not large enough. The material has been purchased for a new oil house, which will be put up during the coming season.

1031, 1032, 1033, 1034. Coos Bay lights, Oregon.—The sundry civil appropriation act approved June 11, 1896, appropriated $500 for the establishment of range lights at Coos Bay, Oregon. The following-named lights were therefore established on June 15, 1897:

Coos Bay entrance range light, front light.—A fixed white lantern light, 12 feet above the water, suspended from an arm on a post at high water mark on the point of rocks on the south side of the entrance to the bay.

Rear light.—A fixed white lantern light, 45 feet above the water, suspended from an arm on a post on a wooded bluff on the east side of South Slough, in rear of the front light.

Coos Bay inside range lights, front light.—A fixed red lantern light, 13 feet above the water, suspended from an arm on a post at high-water mark in Charleston cove, south side of Coos Bay and about 700 feet from Coos Bay entrance range front light.

Rear light.—A fixed white lantern light, 65 feet above the water, suspended from an arm on a post on a hill, 710 feet in rear of the front light.

Pony Bend light.—A fixed white lantern light, 12 feet above the water, suspended from an arm on a post on the westerly side of the bay, in the first bend above Empire City and opposite Pony Point.

1043. Cape Meares, south of Tillamook Bay, seacoast of Oregon.—Three furnaces were put in. Four ladders were furnished for fire protection and painting. A number of fallen trees were cleared away and numerous washouts were filled up in the road leading to the station.

1044. Tillamook Rock light and fog-signal station, Pacific Ocean, 18 miles south of the entrance to the Columbia River, seacoast of Oregon.—The tramway and stairs leading from the platform to the dwelling, which were badly eaten by salt water, were repaired by combining the steps and tramway in one construction and making them of concrete. The landing apparatus, which was in a dangerous condition, was repaired by putting in a new boom, lower casting, and cable chain. The boilers of the fog signal being beyond economical repair, two were replaced by new ones. The whole apparatus was thoroughly overhauled. The old wooden water-closet, which was beyond repair, was replaced by a new one of brick. The revolving apparatus was overhauled and put in good repair. As the roof of the dwelling is wood, covered with galvanized iron, and as it leaked badly from being injured by rocks cast up by the sea, a coating of asphalt, coal tar, and gravel was put on last year. This did not stop the leaking entirely.

1047. Fort Stevens light and fog signal, mouth of the Columbia River, Oregon.—The sundry civil appropriation act, approved June 11, 1896, appropriated the sum of $11,000 for discontinuing the Point Adams light and reestablishing it with a fog signal at or near the outer end of the wharf at Fort Stevens, near the mouth of the Columbia River, Oregon. On March 23, 1897, the inspector and engineer of the district visited the locality and selected the site. Nothing has been done toward its acquisition, as it is located upon ground which is in dispute between the War Department and private parties, and is now being settled in the courts. Any other site than the one selected would interfere with the use of the batteries now under construction at this place.

1105. North Head, entrance to Columbia River, Washington.—Proposals for furnishing the metal work and for the erection of the station were opened August 3, 1896. On September 8, 1896, contract was made for the erection, and on September 10, 1896, for furnishing the metal work. The contractors for furnishing the metal work have made poor progress. By the terms of the contract the work was to be completed and delivered on the wharf at Fort Canby, Wash., by February 23, 1897. The contractor for the erection has pushed his work. The dwellings and barn are completed. The tower, workroom and oil houses were carried up as far as was possible until the metal work arrived. Owing to this delay the contractor has been compelled to cease active operations. On May 10, 1897, he was granted an extension of the time within which his work was to be done.

1107. Grays Harbor, seacoast of Washington.—Bids for furnishing the metal work and for the erection of the station were opened November 16, 1896. On January 30, 1897, contract was made for the erection, and on January 23, 1897, for the furnishing of the metal. The contractor for furnishing the metal work is now nearing the completion of his contract. By the terms of the contract the work was to have been completed and delivered by June 18, 1897. The contractor for the erection is now at the site with his plant. A road leading to the station and sheds for material was built. Considerable material has been delivered. About two-thirds of the stone for the base of the tower has been cut. The buildings have been located and clearing and grading is going on. The trestle for the water tank and windmill is completed and the well is dug. The bulkhead for the fog-signal building is finished. By the terms of the contract the work must be completed and delivered on or before October 18, 1897.

Thirteenth District.

1108. Destruction Island light and fog-signal station, seacoast of Washington.—The work of building an addition of six rooms and a wood shed on the north side of the assistant keeper's dwelling was completed. The tramway leading from the top of the incline to the fog signal, with a branch to the dwellings, which had become unfit for use by rotting of the ties and rusting of the rails, was put in thorough repair by laying new ties and rails.

1110. Cape Flattery light and fog-signal station on Tatoosh Island, Pacific Ocean, entrance to the Strait of Juan de Fuca, Washington.—A new fog-signal building was built of brick, with cement floor, brick chimney, and a standing seam galvanized iron roof. A 15,000-gallon water tank was placed upon a brick foundation on the south side of the main dwelling and the necessary connections were made. One of the boilers of the fog signal being beyond economical repair, a new one was purchased and is now being put in place. The whole fog-signal apparatus was overhauled and repaired.

—. *Slip Point, Clallam Bay, Strait of Juan de Fuca, Washington.*—Owing to the great distance between the fog signals at Cape Flattery and New Dungeness and the unsatisfactory results from the Ediz Hook fog bell, steamers plying the Strait of Juan de Fuca have great difficulty during thick and foggy weather in making this run. Numerous complaints have been made by owners and masters of the vessels. There is no fog signal between Cape Flattery and Ediz Hook, a distance of some 70 miles. Owing to the frequency and density of fogs and smoky weather an intermediate fog signal is greatly needed. It is estimated that a Daboll trumpet, with a suitable building, ground, etc., could be erected for not exceeding $7,000, and it is recommended that an appropriation of that amount be made therefor.

1112. Ediz Hook light and fog-signal station, Strait of Juan de Fuca, Washington.—The fog bell, which was but 2 feet 9 inches above the level of the ground and inaudible in some directions, was raised 19 feet 4 inches above the ground level and supported on a gallows frame. This change has improved its range somewhat, but not very much. It would seem that some local peculiarity must occasion the trouble. It is possible that a bell of different tone, or a heavier blow struck by an engine of some kind, may solve the problem.

1113. New Dungeness light and fog-signal station, Strait of Juan de Fuca, Washington.—The following recommendation made in the Board's last two annual reports is renewed:

> The dwellings erected at this station are arranged for the accommodation of two families and one single man; but as there are four keepers employed, and sometimes three of them with families, there is insufficient accommodation, and a new dwelling is urgently needed. The estimated cost of a suitable building, cistern, outhouse, etc., for this station is $4,000.

Thirteenth District.

1120. Point No Point light and fog-signal station, Puget Sound, Washington.—The following recommendation made in the Board's last three annual reports is renewed:

> It appears that the present fog bell at Point No Point does not satisfy the needs of the service. It is recommended, therefore, that a first-class fog signal be installed in place of the bell. It is estimated that this can be done for $6,000, and the Board recommends that an appropriation of this amount be made therefor.

1122. West Point light and fog-signal station, Puget Sound, Washington.—The contractors for furnishing and placing in position 120 cubic yards of rough stone along the bulkhead at this station completed their work. Various repairs were made.

1123. Battery Point post light, Puget Sound, Washington.—The following recommendation made in the Board's last two annual reports is renewed:

> The establishment of a fog signal at this point is strongly urged. It is estimated that a fog bell, with suitable dwelling, grounds, etc., could be erected for $6,000, and it is recommended that an appropriation of this amount be made therefor.

1125. Robinson Point post light and fog signal, Puget Sound, Washington.—Materials were purchased and delivered for a new tower for the lens lantern and the work of framing was partly done. Owing to unusually bad weather the completion of this work was postponed. It will be finished during the coming season. The fog signal, engine, pump, boiler, etc., were put in good order. New water pipes were put in the cisterns. Now that there is a fog signal here an additional keeper is much needed. But the keeper's dwelling is barely sufficient for the present keeper and his family. An additional keeper's dwelling is therefore an urgent necessity. It is estimated that a suitable building can be erected for not exceeding $3,000, and it is recommended that an appropriation of that amount be made therefor.

1126. Point Brown post light, Puget Sound, Washington.—The following recommendation made in the Board's last two annual reports is renewed:

> In addition to the stake light at this important turning point of the numerous water crafts plying between Tacoma and points down the sound, a fog signal is urgently required. It is estimated that a bell struck by machinery could be erected, together with the necessary buildings, dwellings, etc., for about $6,000, and it is recommended that an appropriation of this amount be made therefor.

—. *Burrows Island, Rosario Strait, Washington.*—There is much traffic through Rosario Strait, which will naturally increase in the future. During certain seasons of the year fog and smoke from forest fires prevail. Burrows Island is a point of departure for most of the vessels plying the strait. The tides and currents here are strong and variable, and there are several dangerous reefs in the immediate vicinity. A light and fog signal at the southwest point of Burrows

Island would be of great use to commerce and navigation. It is estimated that they could be established for not exceeding $15,000, and it is recommended that an appropriation of this amount be made therefor.

—. *Semiahmoo light and fog signal, Semiahmoo Bay, Gulf of Georgia, Puget Sound, Washington.*—There is now a post light at Semiahmoo. While it is useful, it is insufficient for the needs of commerce. Blaine, the principal town in these waters, has a population of some 1,500, and certain lumber interests. At Semiahmoo, on the opposite side of the bay, which is narrow, there is a large cannery. Several lines of steamers from Vancouver on the north and Tacoma on the south touch at Blaine. During the fishing season this commerce is increased by vessels running in connection with the cannery. The harbor is difficult to enter, particularly at night. A small light and a fog signal would be of much service to commerce. It is estimated that they could be established for not exceeding $25,000, and it is recommended that an appropriation of this amount be made therefor.

REPAIRS.

Repairs were made at the following-named stations:

1035. Umpqua River, Oreg.
1036. Heceta Head, Oreg
1091. Willamette River, Oreg.
1106. Willapa Bay, Wash.
1113. New Dungeness, Wash.
1114. Smith Island, Wash.
1115. Point Wilson, Wash.
1116. Admiralty Head, Wash.
1120. Point No Point, Wash.
1152. Turn Point, Wash.
1153. Patos Islands, Wash.

POST LIGHTS.

These lights are efficient aids to navigation in the inland waters of the Columbia and Willamette rivers, Puget and Washington sounds, and their adjacent waters.

Three new post lights were established during the year and one was discontinued. With the exception of the lights near La Conner and those in the Skagit River, which are inaccessible to the light-house tender, all the lights were inspected, and the stakes, gallows frames, and beacons were repaired and painted. The keepers generally did their work in a satisfactory manner.

LIGHT-VESSELS.

1045. *Columbia River light-vessel, No. 50, Pacific Ocean, off the Columbia River Bar, Washington.*—This vessel was continuously on her station. The boilers were retubed and minor repairs to the fog-signal machinery were made during the year. The vessel was placed off the Columbia River Bar in May, 1892, and has been off her station but fifteen days up to the present time. Quite extensive repairs to the hull, lantern houses, etc., and minor repairs to the fog-signal machinery are necessary. The vessel will be brought in from her station as soon after August 1 as practicable.

1109. Umatilla Reef light-vessel, No. 67, Pacific Ocean, off the seacoast of Washington.—This vessel is nearly completed, and when finished will take the station of light-vessel No. 50 off Columbia River Bar until the repairs to that vessel are completed. Early in October, 1896, it became evident that the contractor would be unable to finish the vessel in accordance with the terms of the contract. All efforts to arrange with the bondsmen for the completion of the vessel having failed, on November 12, 1896, the contract was declared forfeited. Bids for the completion of the vessel were advertised for, and the contract was awarded to the lowest bidder, who is to have the light-vessel completed by July 27, 1897.

NOTE.—This vessel was duly completed and was put on Columbia River station on August 15, 1897.

Relief light-vessel for the Twelfth and Thirteenth light-house districts (Pacific Coast).—There are now three light-vessels stationed at important points on the Pacific Coast, one in the Twelfth and two in the Thirteenth light-house districts. If it becomes necessary to temporarily withdraw any one of these vessels there is no relief light-vessel to replace it. Such a vessel is urgently needed. It is estimated that one can be built for not exceeding $80,000, and it is recommended that an appropriation of this amount be made therefor.

DAY OR UNLIGHTED BEACONS.

The day beacons were overhauled, renovated, and in some instances were rebuilt. All are in good order and condition. One was abolished during the year.

FOG SIGNALS OPERATED BY STEAM OR HOT AIR.

1029. Coquille River, Oregon.—The Daboll trumpet was in operation some 455 hours and consumed about 7 tons of coal.

1030. Cape Arago, Oregon.—The Daboll trumpet, established September 15, 1896, was in operation some 294 hours and consumed about 3 tons of coal.

1044. Tillamook Rock, Oregon.—The first-class siren, in duplicate, was in operation some 233 hours and consumed about 14 tons of coal.

1045. Columbia River light-vessel, No. 50, Washington.—The 12-inch steam whistle was in operation some 815 hours and consumed about 60 tons of coal. This does not include coal used for heating, distilling, and other purposes.

1108. Destruction Island, Washington.—The first-class steam siren, in duplicate, was in operation some 408 hours and consumed about 26 tons of coal.

Thirteenth District.

1110. Cape Flattery, Washington.—The 12-inch steam whistle, in duplicate, was in operation some 713 hours and consumed about 71 tons of coal.

1113. New Dungeness, Washington.—The 12-inch steam whistle was in operation some 736 hours and consumed about 59 tons of coal.

1115. Point Wilson, Washington.—The 12-inch steam whistle was in operation some 623 hours and consumed about 53 tons of coal.

1122. West Point, Washington.—The Daboll trumpet was in operation some 892 hours and consumed about 7 tons of coal.

1125. Robinson Point, Washington.—The 12-inch steam whistle was in operation some 528 hours and consumed about 35 tons of coal.

1152. Turn Point, Washington.—The Daboll trumpet was in operation some 659 hours and consumed about 2 tons of coal.

1153. Patos Islands, Washington.—The Daboll trumpet was in operation some 824 hours and consumed about 5 tons of coal.

FOG SIGNALS OPERATED BY CLOCKWORK.

Warrior Rock, Columbia River, Oregon.—The fog bell was in operation some 344 hours.

Willamette River, Oregon.—The fog bell was in operation some 166 hours.

Ediz Hook, Washington.—The fog bell was in operation some 848 hours.

Marrowstone Point, Washington.—The fog bell was in operation some 585 hours.

Point No Point, Washington.—The fog bell was in operation some 558 hours.

BUOYAGE.

Twelve buoys were established and two discontinued. Owing to the transfer of the light-house tender *Columbine* to the service of the engineer of the district, the weak condition of the tender *Manzanita*, and her withdrawal from service for repairs, the buoys could not be changed as frequently as was desirable. Many should be changed at once, particularly those on the seacoasts of Oregon and Washington. The buoyage in Alaskan waters was thoroughly overhauled and is in excellent condition. Effort will be made to put the other buoys in similar condition as soon as the services of the tender are available. The 8 whistling and 5 bell buoys are in good order.

DEPOTS.

Tongue Point, Columbia River, Oregon.—The keeper's dwelling, storehouses, wharf, and grounds are in good condition.

Thirteenth District.

The recommendation made in the Board's annual report for the last two years to erect 2 inexpensive oil houses, such as are used at various light-stations, on solid ground at the end of the wharf, is renewed:

The danger from fire to the mineral oil stored in the wooden building on the wharf is very great and is occasioned by the cinders coming from passing river steamers which use wood for fuel. It is proposed to connect the depot wharf with the oil houses by a track over which a hand car can be propelled. It is estimated that these improvements can be made for $5,000, and it is recommended that an appropriation of this amount be made therefor.

TENDERS.

The Manzanita.—This wooden screw steamer was delivered to the contractors for extensive repairs to both hull and machinery on April 27, 1897. It is expected that the vessel will be ready for service by the first of October, 1897. She was engaged from August 17 to October 8, 1896, on special duty under the Chief of Engineers, United States Army, in Alaskan waters. During the rest of the year she was employed in the general work of the district. She was so weak that care was taken that she should not be caught outside in heavy weather. She was under steam some 287 days. In that time she ran some 10,058 nautical miles, during which she burned about 800 tons of coal. She was employed at the light-house depot for some 840 hours. She set, changed, or renovated 133 buoys, renovated 7 beacons and day marks, established 12 new aids to navigation, delivered about 172 tons of coal at light-stations, made 7 inspection trips, landed 517 tons of freight, of which 218 were for the Engineer of the light-house district, and handled about 20,000 feet of lumber.

The Columbine.—This steel screw steamer was transferred to the charge of the Engineer of the district on January 1, 1897, since when she has been used for construction, repairs, and general service. During this time she received various repairs. The thrust bearings and all the main journal and crank-pin brasses were refilled with metal. Eight new valves with seats, guards, and springs for the main feed pump were put in. A new valve stem for the surface blow of the port boiler was put in and the fire-room floor was repaired. The old broken hawse pipe in the starboard bow was taken out and replaced by a new one. The boilers were cleaned twice and the machinery was thoroughly overhauled. On March 4, 1897, the steamer was taken into dry dock, cleaned, and one coat of anticorrosive compound and one coat of antifouling compound were applied to the usual height. A few minor repairs were made. She steamed about 7,264 nautical miles and consumed some 773 tons of coal.

FOURTEENTH DISTRICT.

The Fourteenth district extends on the Ohio River from Pittsburg, Pa., to Cairo, Ill., 966 miles; on the Tennessee River, 255½ miles; and on the Great Kanawha, 73½ miles; in all, a distance of 1,295 miles, and embraces all the aids to navigation within these limits.

Inspector.—Lieut. Commander William W. Gillpatrick, United States Navy, to October 10, 1896, on which date he died; Commander B. S. Richards, United States Navy, from October 24, 1896.

Engineer.—Maj. William H. Heuer, Corps of Engineers, United States Army.

There are in this district—

Post lights	502
Floating lights	37
Light-keepers	494
Steam-tender *Goldenrod*, for supply and inspection	1
Number of day marks	5

This district is in excellent condition. The lights on the Tennessee above Waterloo were all inspected and supplied on the last inspection trip and left in good condition. This was the first time in two years that it was possible to visit them. On the last trip, which ended May 28, 1897, new posts were set and such repairs as were required were made. Posts were painted, and such trees and brush as were interfering, or likely to interfere, with the lights were cleared away. Sufficient supplies were left the keepers to insure proper service through any probable continuance of low water. The light-keepers have, as a general thing, performed their duties in a satisfactory manner. Masters and pilots have rendered assistance by recommending changes and additional lights and in reporting derelict keepers. They speak in complimentary terms of the efficiency of the service in this district.

RECAPITULATION.

Total number of lights	539
Number of post lights	502
Number of float lights	37
Number of day marks	5
Number of light-keepers	494
Number of post lights established	8
Number of float lights established	2
Number of post lights changed to floats	2
Number of posts moved	5
Number of posts reset	37
Number of trees cut	2,821

14

Fourteenth District.

Number of acres of brush cleared	16
Number of gallons of oil distributed	16,783
Number of miles steamed	5,073
Tons of coal consumed	635
Number of cords of wood used	0
Average price of coal per ton	$1.27

TENDER.

The Goldenrod.—This stern-wheel steamer received new smokestacks. Minor repairs were made by the force on board. She steamed some 5,073 miles, and in doing so burned about 635 tons of coal.

The map of this district, prepared in the Board's office from data compiled by the district Engineer, and which appeared for the first time in the Board's report for 1895, has been revised and brought up to date.

FIFTEENTH DISTRICT.

The Fifteenth district extends on the Mississippi River from the head of navigation to Cairo, Ill.; on the Missouri River to Kansas City, Mo., and on the Illinois River from La Salle to its mouth, being in all a distance of 1,582½ miles, and embraces all the aids to navigation within these limits.

Inspector.—Commander Abraham B. H. Lillie, United States Navy, until April 30, 1897; since then, Lieut. Commander H. B. Mansfield, United States Navy.

Engineer.—Lieut. Col. Amos Stickney, Corps of Engineers, United States Army.

Number of lights	517
Number of keepers	340
Number of channel marks	6
Number of trees cut down	1,287
Number of acres cleared	14
Number of gallons of oil used	15,243
Number of lights established	28
Number of lights discontinued	36
Steamer *Lily*, for supply and inspection	1

The number of lights remains practically the same as last year. The absence of requests from masters and pilots of steamers for an increase in the number of lights makes it reasonable to believe that the present number is adequate to the needs of commerce.

In the Mississippi River from St. Paul to Cairo, a distance of 923 miles, there are 452 lights in operation, an average of about 1 light for every 2 miles. A boat making the entire run has constantly one of them in range, and more frequently two or more.

In the Illinois River there are 42 lights, covering a distance of 216 miles. This number is considered sufficient, as the navigation of the river is not difficult, and over a greater part of the run lights are needed only at long intervals.

On the Missouri River 30 lights are maintained over a distance of 178 miles from its mouth. This number has remained practically the same for years. The importance of these lights as aids to navigation has grown gradually less from year to year on account of the gradual falling off of river traffic, until this present season, when it is likely that there will be no call for any lights as there is no prospect at this time of any boat being entered for trade on the Missouri. In consequence the lights on the Missouri have not been started this year. Last year a small packet made weekly trips up the Missouri from St. Louis for

Fifteenth District.

a distance of 180 miles, but it was destroyed, after running six weeks, in the May tornado. Subsequently another boat was put in her place, but she was withdrawn after making a couple of trips.

The district has been twice visited by floods during the year. The first, which occurred in January, was remarkable for its sudden development. The river rose 19 feet at St. Louis in three days, but it as quickly subsided. Upon this occasion several of the stations and parts of their outfits in exposed localities were lost in the Lower Mississippi.

A flood of greater magnitude and longer duration than the first took place in March and April and extended over the entire district. The water rose to 29 feet on April 11 at St. Louis. This was but 1 foot below the danger mark.

There was no interruption to navigation below St. Louis by ice, on account of the open winter, and the lights, in consequence, were kept burning without intermission in this part of the district. In other localities they were extinguished and lighted as navigation closed and opened.

RECAPITULATION.

Lights established	28
Lights discontinued	36
Decrease in number of lights	8
Number of fixed and floating lights	517
Number of keepers	340
Channel marks	65

TENDER.

The Lily.—This wooden side-wheel steamer is in fair condition. She was repaired in August, at Mound City, under contract. The repairs were confined to the hull, and consisted practically of a new bow and 1,300 running feet of outside planking and 400 running feet of frames. Rot was found to prevail to a great extent, and was progressing rapidly. All the rotten outside planking and the worst of the frame timbers that could be found were removed. The general condition of the hull did not warrant the additional expense due to a more thorough overhauling.

The repairs that were made were considered sufficient in extent to render the boat serviceable for about two years from the time she left the ways. In other respects, including upper works, boilers, and engines, she was in good condition. During the year new fire linings were fitted to the furnace doors, and repairs were made to the electric plant. On account of high water the tender was unable to start on her inspection and supply trip in the Upper Mississippi until the middle of May. While it required much time and labor to restore the lights to their former condition of efficiency, everything was successfully accomplished, and the tender completed the work to St. Paul on

June 8, 1897, and she arrived at St. Louis on June 16. On June 17 she left for Cairo, and got back to St. Louis on June 26, having restored or replaced nearly every light between Cairo and St. Louis. The continued and extreme high water had thrown much extra labor upon the light keepers, a majority of whom showed judgment and intelligence in the ingenious expedients resorted to by them to preserve the posts and maintain the lights. On June 30 the tender was at St. Louis preparing for a pay and inspection trip to the Upper Mississippi. During the year her crew cut down 1,287 trees and cleared away 14 acres of underbrush which intercepted lights. She delivered 15,243 gallons of oil at light stations; she steamed about 4,889 miles, and to do this burned some 745 tons of coal.

The map of this district, prepared in the Board's office from data compiled by the district Engineer, and which appeared for the first time in the Board's report for 1895, has been revised and brought up to date.

16

SIXTEENTH DISTRICT.

The Sixteenth district extends on the Mississippi River from Cairo, Ill., to New Orleans, La., and on the Red River a distance of 8 miles, being in all a distance of 966 miles, and embraces all the aids to navigation within these limits.

Inspector.—Commander W. T. Burwell, United States Navy.

Engineer.—Lieut. Col. Amos Stickney, Corps of Engineers, United States Army.

In this district there are—

Post lights	360
Light-keepers	325
Steamer *Joseph Henry*, for supply and inspection	1

There are in the Sixteenth district 360 post lights, cared for by 325 keepers.

The efficiency of the district was well maintained and the work of the keepers was satisfactory. During the unprecedented flood of the Mississippi River during the spring months few posts were visible above Greenville, Miss., but the lights were displayed from trees or bushes and faithfully tended, in many instances at considerable risk.

Complete inspections of the district, during which each post light in the district was visited, were made each quarter during the year. The following is an exhibit of work done during the year:

Post lights visited and painted, when the keepers were paid and supplied	1,328
Post lights established	39
Post lights discontinued	39
Post lights moved	209
Trees felled (over 4 inches in diameter)	839
Acres of willows, brush, etc., cleared	13¼
Gallons of mineral oil issued to keepers	12,927
Gross of wicks issued to keepers	63

TENDER.

The Joseph Henry.—During the year this wooden side-wheel steamer, conveying the Inspector, steamed 8,565 miles, consuming 1,007 tons of coal and 5 cords of wood. She was under steam 230 days. The inside of the cabin, staterooms, texas, and pilot house were painted. In November, 1896, she was placed on the docks at Paducah and new outsides to the wheelhouses were built and necessary repairs were made to the hull and guards. These consisted in part of a new rudder complete, 18 outriggers, 5 floor timbers, 11 long and 7 short top timbers, 6 futtocks, 3 water-wheel beams, some 500 running feet of straight and crooked planking, knuckle, and floor strake, new stem band, steel sheathing the bow, and calking. The repairs completed during the latter part of the year consisted of the installation of new cylinders for the engines, new cylinder timbers, Reese cut-off, cast-steel pillow blocks, cast-steel bedplates, etc., together with necessary timber supports, new decking, and minor repairs to the machinery.

The map of this district, prepared in the Board's office from data compiled by the district Engineer, and which appeared for the first time in the Board's report for 1895, has been revised and brought up to date.

CONCLUSION.

The Board feels warranted in reporting, in conclusion, that the general efficiency of the service has been maintained throughout the year at as high a standard as was practicable with the means available.

W. S. SCHLEY,
Captain, United States Navy,
Chairman.
GEO. F. F. WILDE,
Commander, United States Navy,
Naval Secretary.
JOHN MILLIS,
Captain, Corps of Engineers, United States Army,
Engineer Secretary.

The SECRETARY OF THE TREASURY.

INDEX.

A.

Page.

- Absecon, N. J 83
- Ahnapee Pierhead, Wis 135
- Aids to navigation, appropriations made for 1897–98 26
    - asked for 1898–99 27–38
    - statistics of, to June 30, 1897 .... 7, 25
    - maintained on June 30, 1897 .... 7, 25
    - memorandum relative to improvements 28
    - temporary changes in 18
- Alaskan waters, buoyage 7
- Alcatraz Island, Cal 173
- Alligator Reef, Fla 118
- Alpena, Mich 155
- *Amaranth*, tender, Ninth and Eleventh districts 131, 143, 154, 167
    - steam launch of 168
- Amelia Island Range, Fla 111
- American Shoal, Fla 118
- Angel Island, Cal 172
- Annapolis depot, Md 105
- Annisquam Harbor, Mass 47
- Año Nuevo Island, Cal 171, 177
- Apalachicola Bay, Fla 37, 119
    - beacon on dredged channel 119
- Appropriations made for 1897–98 .... 26–27, 30–36
    - recommended for 1898–99 .... 26–27, 30–38
    - supplies 26, 27, 36
    - repairs, etc 26, 27, 36
    - keepers' salaries 26, 30, 36
    - light-vessels 26, 31, 36
    - buoyage 26, 32, 36
    - lighting rivers 26, 33, 36
    - fog signals 26, 32, 36
    - survey of sites 26, 36
    - oil houses 26, 35, 36
    - flags at light-stations 35, 36
    - reimbursement of losses of seamen 37
    - asked for separate building for offices 35
    - special 26, 27, 36
- *Arbutus*, tender, Seventh and Eighth districts 117, 122, 124, 130
- *Armeria*, supply steamer 57, 78
- Ashtabula, Ohio 146, 151
- Automatic buoys. (*See* Bell buoys; Whistling buoys.)
- *Azalea*, tender, Second district 47, 55

B.

Page.

Bailey Harbor Range, Wis 135
Baker Island, Mass 48
Ballard Reef light-vessel, No. 63, Mich 151
    new light-vessel and float lights 26, 151
Baltimore light and fog-signal station 98
Barataria Bay, La 126
Barnegat, N. J 83
Bar Point light-vessel, No. 59, Mich 151
Bartlett Reef light-vessel, No. 13, Conn 65
Bass Harbor Head, Me 40
Battery, N. Y 37, 62
Battery Point, Wash 38, 185
Bayou St. John, La 126
Bayside Range cut channel electric buoys 70
Beacon lights on Rappahannock River, Va 37, 95
Beacons (day or unlighted) in First district 39, 44
        Second district 47, 53
        Third district 57, 67
        Fourth district 83, 90
        Fifth district 94, 104
        Sixth district 108, 114
        Seventh district 117, 120
        Eighth district 124, 129
        Eleventh district 154
        Twelfth district 169, 176
        Thirteenth district 181, 187
        Fourteenth district 190
        total number 7, 25
    (lighted) used as day marks, Twelfth district 169
Bear Island buoy depot, Me 45
Bell buoys in position (*See* Buoyage) 7, 25
    established during the fiscal year 17
    discontinued during the fiscal year 18
    First district 39
    Second district 47
    Third district 57, 77
    Fourth district 83
    Fifth district 94
    Sixth district 108
    Seventh district 117
    Eighth district 124
    Eleventh district 154
    Twelfth district 169, 179
    Thirteenth district 181
Big Bay Point, Mich 159, 165
Big Sable, Mich 158
Black Ledge, Conn 37, 59
Black River Pierhead range, Ohio 147
Block Island, R. I 58, 69
Bloody Point Range, S. C 110
Blue Hill Bay, Me 41
Bodie Island, N. C 99
Bonita Point, Cal 172, 177
Boon Island, Me 36, 43

Page.
Boston light-vessel, No. 54, Mass ... 50, 53
Boston, Mass., machine and lamp shop ... 54
Boundaries of First district ... 39
  Second district ... 47
  Third district ... 57
  Fourth district ... 83
  Fifth district ... 94
  Sixth district ... 108
  Seventh district ... 117
  Eighth district ... 124
  Ninth district ... 131
  Tenth district ... 144
  Eleventh district ... 154
  Twelfth district ... 169
  Thirteenth district ... 181
  Fourteenth district ... 190
  Fifteenth district ... 192
  Sixteenth district ... 195
Bowlers Rock, Va ... 95
Braddock Point, N. Y ... 145
Bramble, steam launch, Fifth district ... 94, 106
Brandywine Shoal, Del ... 84
Brazos River, Tex ... 128
Brenton Reef light-vessel, No. 11, R. I ... 65
Bridgeport Breakwater, Conn ... 61
Brunswick Harbor Ranges, Ga ... 111
Buckle Island, Me ... 36, 40
Buffalo depot, N. Y ... 152
Bull Bay, S. C ... 26, 109
Buoyage, appropriation asked for expenses (*See* Appropriations) ... 32, 36
  statistics regarding ... 7, 25
  of Alaskan waters ... 7
Buoy depots. (*See* Depots.)
Buoys and appendages, General Light-House Depot ... 77
Buoys in First district (*See* Aids to navigation) ... 39, 45
  Second district ... 47, 54
  Third district ... 57, 70
  Fourth district ... 83, 91
  Fifth district ... 94, 104
  Sixth district ... 108, 114
  Seventh district ... 117, 120
  Eighth district ... 124, 129
  Ninth district ... 131, 141
  Tenth district ... 144, 152
  Eleventh district ... 154, 166
  Twelfth district ... 169, 177
  Thirteenth district ... 181, 188
  Alaskan waters ... 7
Buoys, number maintained by Light-House Establishment ... 7, 25
  special, established and discontinued ... 17–24
  bell, number in position ... 7, 25
  ice, in Second district ... 47
    Fourth district ... 83
  gas, number in position ... 7, 25
  changes in ... 17–24

Page

Buoys, electric, number in position 7, 25
  whistling, number in position 7, 25
  electric, Third district 25, 70
Burnt Coat Harbor, Me 36, 40
Burrows Island, Wash 38, 185
Bush Bluff light-vessel, Va 102
Butler Flats, Mass 49

C.

Cactus, tender, Third district 57, 80
Cana Island, Wis 135
Cape Ann, Mass 47, 53
Cape Arago, Oreg 182, 187
Cape Blanco, Oreg 38, 181
Cape Charles light-vessel No. 49, Va 101, 103
Cape Elizabeth, Me 36, 42, 45
Cape Fear, N. C 37, 108, 109
Cape Fear River (N. C.), range lights 37, 109
Cape Flattery, Wash 184, 188
Cape Hatteras Beacon, N. C 99
Cape Henlopen, Del 84
Cape Henry, Va 94, 103
Cape Lookout Shoals light-vessel, N. C 37, 102
Cape May, N. J 37, 84
Cape Meares, Oreg 182
Cape Mendocino, Cal 38, 174
Cape San Blas, Fla 26, 119
Carlton Island, N. Y 144
Carysfort Reef, Fla 117
Castle Hill, R. I 57
Castle Pinckney depot, S. C 114
Cedar Keys, Fla 118
Cedar Point, Md 98
Cedar Point, Ohio 147
Chambers Island, Wis 137
Chandeleur, La 126
Chapel Hill Range Cut Channel electric buoys 70
Chapman Shoal, N. Y 38, 144
Characteristics of lights changed 12
  fog signals changed 14
Charleston light-vessel No. 34, S. C 113
Cheboygan, Mich 156, 165
Cheboygan River range, Mich 157
Chequamegon Point, Wis 26, 161
Cherry Island range, Del 87
Chincoteague depot, Va 92
Choctawhatchee beacons, Fla 119
Christiana, Del 87
Church Point, Mich 157
Clerical force, Light-House Board, increase asked 36
Cleveland, Ohio 146, 147, 151
Clover, schooner, tender Seventh district 117, 123, 124, 130
Cohansey, N. J 85
Columbia River light-vessel No. 50, Wash 186, 187
Columbine, tender, Thirteenth district 181, 189

Page.
Conanicut Island, R. I 58
Coney Island, N. Y 62
Conneaut, Ohio 146
Coos Bay, Oreg 182
Coquille River, Oreg 181, 187
Cornfield Point light-vessel No. 48, Conn 65, 69
Covells Folly post light, N. Y 64
Cow Point post light, Conn 59
Coxsackie, N. Y 64
Craighill Channel, Md 98
Crescent City, Cal 174
Crisps Point, Mich 38, 158
Cross Rip light-vessel No. 5, Mass 51
Cubits Gap, La 37, 126
Cuckolds fog-signal station, Me 42, 45

D.

Dahlia, tender, Ninth district 131, 142
Daisy, launch, Third district 57, 80
Dark Hole Range, Mich 157
Day marks or unlighted beacons. (*See* Beacons.)
  recommendations relative to improvements in 29
Deep River post light, Conn 60
Deep Water Point Range, N. J 86
Deer Island Thorofare, Me 41
Delaware Breakwater, Del 84, 90
Depot for Sixth district 37, 114
  Ninth district 38, 142
  Tenth district 38, 152
  Eleventh district 38, 166
Depots in First district 45
  Second district 54
  Third district 73
  Fourth district 91
  Fifth district 105
  Sixth district 114
  Seventh district 121
  Eighth district 129
  Ninth district 142
  Tenth district 152
  Eleventh district 166
  Twelfth district 179
  Thirteenth district 188
Destruction Island, Wash 184, 187
Detour, Mich 156, 164
Detroit, Mich 166
Devils Island, Wis 161, 165
Diamond Shoals light-vessel No. 69, N. C 103
Dice Head, Me 42
Dollers Point, Va 37, 95
Doubling Point, Me 42
Drift, schooner, temporary light-vessel 102
Duluth range, Minn 161
Dumpling Rock, Mass 49

Page.

- Dunkirk, N. Y 146
- Duxbury Pier, Mass 48

E.

- Eagle Harbor, Mich 160, 165
- Eagle River, Mich 38, 160
- East Chop, Mass 49
- Eastern Point, Mass 47
- Ecorse range, Mich 150
- Edgartown, Mass 49
- Edgmoor depot, Del 37, 91
- Ediz Hook, Wash 184, 188
- Egg Island, N. J 85
- Egg Rock, Mass 48
- Egmont Key, Fla 37, 118
  - depot 121
- Eighth district, officers in charge of 4, 124
  - statistics of 124
- Elba Island Range, Ga 110
- Electric and gas lighted buoys in position 7, 25
- Electric-lighted buoys, Third district 57, 70
- Eleven-Foot Shoal light-vessel, No. 60, Mich 139, 141
- Eleventh district, officers in charge of 4, 154
  - statistics of 154
- Employees, crews of light-vessels, tenders, etc 7
  - increase in clerical force recommended 36
- Engineer, First district 3, 39
  - Second district 3, 47
  - Third district 3, 57
  - Fourth district 3, 83
  - Fifth district 3, 94
  - Sixth district 4, 108
  - Seventh district 4, 117
  - Eighth district 4, 124
  - Ninth district 4, 131
  - Tenth district 4, 144
  - Eleventh district 4, 154
  - Twelfth district 4, 169
  - Thirteenth district 4, 181
  - Fourteenth district 4, 190
  - Fifteenth district 4, 192
  - Sixteenth district 4, 195
- Escanaba, Mich 37, 136
- Esopus Island, N. Y 37, 63
- Estimates, general 26–28, 30–36
  - buoyage 32, 36
  - lighting rivers 33, 36
  - light-vessels 31, 36
  - fog signals 32, 36
  - repairs of light-houses 27, 36
  - salaries of light-keepers 30, 36
  - survey of light-house sites 36
  - supplies of light-houses 27, 36
  - oil houses at light-stations 35, 36
  - flags and flagstaffs at light-stations 35, 36

Page.
Estimates, special 36-38
Execution Rocks, N. Y 61, 69
Executive members of the Light-House Board 3

F.

Farallon Island, Cal 171, 177
Fenwick Island, Del 88
Fenwick Island Shoal light-vessel, No. 52, Md 89, 91
Fifteenth district, officers in charge of 4, 192
  statistics of 192
Fifth district, officers in charge of 3, 94
  statistics of 94
  working plant of 101
Fig Island range, Ga 110
Finns Point range, N. J 86
Fire Island, N. Y 62
Fire Island light-vessel, No. 58, N. Y 26, 65, 70
First district, officers in charge of 3, 39
  statistics of 39
Fisherman Shoal, Wis 37, 136
Fishing Battery, Md 99
Fishing Point beacon, Va 88
Fitchs Wharf post light, N. Y 63
Five Fathom Bank light-vessel, No. 40, N. J 89, 90
Flag at light-stations, appropriation asked 35, 36
Float for gas tanks, Third district 82
Fog signals, appropriation for 26, 32
  estimates for expenses of 32, 36
  change in characteristics 14
  established during the year 11
  number of 7, 25
  operated by clockwork 7, 25
    steam or hot air 7, 25
  recommendations relative to improvements 29
  First district 39, 41
  Second district 47, 53
  Third district 57, 68
  Fourth district 83, 88, 90
  Fifth district 94, 103
  Sixth district 108, 114
  Eighth district 124, 129
  Ninth district 131, 139
  Tenth district 144, 151
  Eleventh district 154, 164
  Twelfth district 169, 176
  Thirteenth district 181, 187
Fort Barrancas range, Fla 119
Fort Mifflin Bar Cut, N. J 87
Fort Niagara, N. Y 145
Fort Point, Cal 172
Fort Point, Me 42
Fort Stevens, Oreg 183
Fort Tompkins, N. Y 62
Forty-Mile Point, Mich 156, 164
Fourteen-Foot Bank, Del 85, 90

	Page.
Fourteenth district, officers in charge of	4, 190
statistics of	190
Fourth district, officers in charge of	3, 83
statistics of	83
Fowey Rocks, Fla	117
Frankfort Pierhead, Mich	132
Franklin Island, Me	42
Frying Pan Shoals light-vessel, No. 1, N. C	112, 114

G.

Galloo Island, N. Y	145, 151
Galveston Jetty, Tex	128
Galveston light-vessel No. 28, Tex	128
***Gardenia*, tender, Third district**	57, 79
Gas-lighted buoys in position	7, 25
Second district	47
Third district	57
Fourth district	83, 91
Fifth district	94
Eighth district	124
Ninth district	131
Tenth district	144
Gedney Channel electric buoys, N. Y	70
General Light-House depot, N. Y	26, 73
Genessee, N. Y	145, 151
***Geranium*, tender, First and Second districts**	16, 47, 54
Goat Island depot, R. I	78
***Goldenrod*, tender, Fourteenth district**	190, 191
Grand Marais, Mich	162
Grand Marais Harbor of Refuge, Mich	26, 158
Grand Traverse, Mich	37, 132
Grassy Island (Ecorse) range, Mich	38, 150
Grays Harbor, Wash	183
Grays Reef, light-vessel, No. 57, Mich	138, 139
Great Duck Island, Me	40, 44
Great Round Shoal light-vessel, No. 42, Mass	50, 53
Great Salt Pond, R. I	58
Green Flats post light, N. Y	63
Green Island, Ohio	148
Green Island, Wis	137
Greens Ledge, Conn	37
Grindel Point, Me	41
Grosse Isle North Channel range, Mich	38, 149
Grosse Isle South Channel range, Mich	38, 149
Grossepoint light-vessel, No. 10, Mich	163

H.

Halibut Rock, Me	36, 44
Handkerchief light-vessel No. 4, Mass	50
Hart Island, N. Y	37, 61
Havre de Grace, Md	99
Hawkins Point, Md	99
Hay Lake Channel, Mich	157
***Haze*, tender, Tenth district**	144, 153
***Hazel*, launch, Twelfth district**	169, 180
Head of St. Mary's River, Mich	38, 158

Page.

Hell Gate post light, N. Y ... 61
Hen and Chickens light-vessel No. 2, Mass ... 52
Hereford Inlet, N. J ... 84
Herson Island, Mich ... 155
Hillsboro Inlet, Fla ... 37, 117
Hilton Head Range, S. C ... 110
Hog Island, R. I ... 37, 58
Hog Island Shoal light-vessel No. 12, R. I ... 65
Hog Island, Va ... 94
Hog Island Wharf and Dollers Point, Va ... 37, 95
Holly, tender, as relief light-vessel ... 102
Hooper Island, Md ... 37, 98
Horn Island, Miss ... 125
Horseshoe Range, N. J ... 87
Hudson City, N. Y ... 63
Humboldt Entrance Range, Cal ... 174
Huron, Ohio ... 147

I.

Ice buoys, Second district ... 47
  Fourth district ... 83
Ice House post light, Conn ... 59
Illuminating apparatus, recommendations relative to improvements ... 28
  General light-house depot ... 7, 78
Indian River post lights, Fla ... 112
Inside Passage beacon lights, Ga. and Fla ... 37, 111
Inspector, First district ... 3, 39
  Second district ... 3, 47
  Third district ... 3, 57
  Fourth district ... 3, 83
  Fifth district ... 3, 94
  Sixth district ... 4, 108
  Seventh district ... 4, 117
  Eighth district ... 4, 124
  Ninth district ... 4, 131
  Tenth district ... 4, 144
  Eleventh district ... 4, 154
  Twelfth district ... 4, 169
  Thirteenth district ... 4, 181
  Fourteenth district ... 4, 190
  Fifteenth district ... 4, 192
  Sixteenth district ... 4, 195
Iona Island, N. Y ... 37, 63
Isle Royale, Mich ... 162
Isles of Shoals, N. H ... 36, 43

J.

Jeffreys Hook, N. Y ... 37, 63
Jessamine, tender, Fifth district ... 94, 107
John Rodgers, tender, Third district ... 57. 79
Johnson Point, N. C ... 100
Jones Island, S. C ... 110
Joseph Henry, tender, Sixteenth district ... 195
Joshua Rocks post light, Conn ... 60
Juniper Island buoy depot, Vt ... 78

K.

Page.

- Keepers' salaries, appropriation asked 30, 36
  - losses, reimbursement of 37
- Kewaunee, Wis 38, 134, 140
- Key West buoy depot, Fla 37, 121

L.

- Laborers in charge of post lights on rivers 7
- Lake Huron light-vessel, No. 61, Mich 163, 164
- Lake St. Clair, Mich 38, 154
- La Pointe, Wis 161, 165
- Latimer Reef, N. Y 59
- Launch, naphtha, Fourth district 83
  - Sixth district 108, 116
  - steam, Third district 57, 82
    - Fifth district 94, 106
    - Ninth district 131
    - Eleventh district 154, 168
    - Twelfth district 169, 180
- Launches, number of 7
- *Laurel*, tender, Seventh district 117, 122
- Lazaretto Point, Md 37, 105
- Leading Point, Md 99
- *Leal*, launch, Fourth district 83
- Lighted aids, total number 7, 25
- Lighted buoys. (*See* Gas buoys; Electric buoys.)
- Light-House Board, executive members 3
  - members, June 30, 1897 3
  - officers 3
  - changes in personnel of 5
  - appropriation asked for separate building 35
  - increase of clerical force asked 36
- Light-house districts, officers in charge of 3
  - sites, survey of, appropriation asked 36
  - establishment, aids to navigation maintained by 7, 25
    - estimates for fiscal year 1898–99 36
    - appropriations for fiscal year 1897–98 26
- Light-houses and beacon lights, appropriations asked 26, 27, 36
  - First district 39
  - Second district 47
  - Third district 57
  - Fourth district 83
  - Fifth district 94
  - Sixth district 108
  - Seventh district 117
  - Eighth district 124
  - Ninth district 131
  - Tenth district 144
  - Eleventh district 154
  - Twelfth district 169
  - Thirteenth district 181
  - total number 7
  - ladders for (Fifth district) 101
- Lighting of rivers, appropriation asked 33, 36
  - statistics regarding. (*See* Post lights.)

Page.

- Light-keepers, total number, 7
  - salaries of, appropriation asked, 30, 36
  - reimbursement for losses, 37
  - in Fourteenth district, 190
    - Fifteenth district, 192
    - Sixteenth district, 195
- Light stations and depots, revised estimates for, 36
  - total number, 7
  - ladders for, 101
- Light-vessel No. 1, Frying Pan Shoals, N. C, 112
  - No. 2, Hen and Chickens, Mass, 52
  - No. 3, Shovelful Shoal, Mass, 50
  - No. 4, Handkerchief, Mass, 50
  - No. 5, Cross Rip, Mass, 51
  - No. 6, Succonnessett Shoal, Mass, 51
  - No. 7, Scotland, N. Y, 66
  - No. 9, relief, Second district, 52
  - No. 10, Grossepoint, Mich, 163
  - No. 11, Brenton Reef, R. I, 65
  - No. 12, Hog Island Shoal, R. I, 65
  - No. 13, Bartlett Reef, Conn, 65
  - No. 16, relief, Third district, 67
  - No. 19, relief, Third district, 67
  - No. 20, relief, Third district, 67
  - No. 23, Ram Island Reef, N. Y, 65
  - No. 28, Galveston, Tex, 128
  - No. 29, relief, Sixth district, 113
  - No. 34, Charleston, S. C, 113
  - No. 37, Fourth district, 89
  - No. 39, relief, Second and Third districts, 52, 67
  - No. 40, Five Fathom Bank, N. J, 89
  - No. 41, Vineyard Sound, Mass, 51
  - No. 42, Great Round Shoal, Mass, 50
  - No. 43, South Pass, La, 128
  - No. 44, Northeast End, N. J, 88
  - No. 45, Winter Quarter Shoal, Va, 89
  - No. 46, Smith Point, Va, 102
  - No. 47, Pollock Rip, Mass, 50
  - No. 48, Cornfield Point, Conn, 65
  - No. 49, Cape Charles, Va, 101
  - No. 50, Columbia River, Wash, 186
  - No. 51, Sandy Hook, N. Y, 66
  - No. 52, Fenwick Island Shoal, Md, 89
  - No. 53, Martins Industry, S. C, 113
  - No. 54, Boston, Mass, 50
  - No. 55, Simmons Reef, Mich, 138
  - No. 56, White Shoal, Mich, 138
  - No. 57, Grays Reef, Mich, 138
  - No. 58, Fire Island, N. Y, 65
  - No. 59, Bar Point, Mich, 151
  - No. 60, Eleven Foot Shoal, Mich, 139
  - No. 61, Lake Huron, Mich, 163
  - No. 62, Poe Reef, Mich, 163
  - No. 63, Ballard Reef, Mich, 151
  - No. 64, Limekiln Crossing (south), Mich, 151

Page.
Light-vessel No. 65, Limekiln Crossing (north), Mich. 151
No. 66, Nantucket Shoals, Mass 51
No. 67, Umatilla Reef, Wash 187
No. 69, Diamond Shoals, N. C 103
No. 70, San Francisco Harbor, Cal 175
Light-vessels, new, appropriation asked for 33, 36–38
appropriation asked for expenses of 31, 36
new, recommended 37, 38
relief for Fourth district 37, 89
relief for Fifth district 37, 103
relief for Twelfth and Thirteenth districts 37, 175, 187
for Overfalls Shoal, Delaware Bay 26, 90
Cape Lookout Shoals, N. C 37, 102
Martins Reef, Mich 38, 163
Poe Reef, Mich 26, 38, 163
Ballard Reef, Mich 26, 151
San Francisco Harbor, Cal 26, 175
Umatilla Reef, Wash 187
Drift, on Bush Bluff, Va 102
Holly, as relief 102
Second district 47, 50
Third district 57, 65
Fourth district 83, 88
Fifth district 94, 101
Sixth district 108, 112
Eighth district 124, 128
Ninth district 131, 138
Tenth district 144, 151
Eleventh district 154, 163
Twelfth district 175
Thirteenth district 181, 186
total number 7, 25
in position 7, 25
for relief 7
Lights and fog signals, alterations in, from July 1, 1896, to June 30, 1897 12–24
recommendations concerning 28
Lights, changes in location of 15
characteristics changed 12
discontinued from July 1, 1896, to June 30, 1897 12
new, exhibited from July 1, 1896, to June 30, 1897 7
number on rivers 25
Lilac, tender, First district 39, 45
Lily, tender, Fifteenth district 192, 193
Limekiln Crossing light-vessel No. 64, Mich 151
Limekiln Crossing light-vessel No. 65, Mich 151
Lime Point, Cal 172, 177
Little Diamond Island depot, Me 45
Little River Head, Me 36, 39
Long Beach, Conn 37
Long Reach post light, Conn 59
Losses of seamen in the Fourth district, reimbursement for 37, 90
light-keepers in Sixth district, reimbursement for 37, 112
Eighth district, reimbursement for 37, 128
Lotus, launch, Ninth and Eleventh districts 131, 154, 168
Lovells Island depot, Mass 54

Page.
Lower Cedar Point, Md 97
Lower Green Spring, N. C 100
Lower Hay Lake Cut Range, Mich 157
Ludington, Mich 38, 133, 149
Ludlam Beach, N. J 83
Lynn Harbor, Mass 48

M.

Machine and lamp shop, Boston, Mass 54
Madroño, tender, Twelfth district 169, 179
Mahon River, Del 85
Mamajuda Island, Mich 150
Mangrove, tender, Seventh district 122
Manhattan Range, Ohio 149
Manistee, Mich 133
Manistee Pierhead, Mich 133, 139
Manitou, Mich 160, 165
Man o'War Rock post-light, N. Y 61
Manzanita, tender, Thirteenth district 181, 189
Maple, tender, Fifth district 94, 105
Marblehead, Mass 48
Mare Island, Cal 173
Marigold, tender, Eleventh district 154, 167
Martins Industry light-vessel No. 53, S. C 113, 114
Martins Reef light-vessel, Mich 38, 163
Marquette, Mich 159, 165
Matinicus Rock, Me 36, 41, 44
Maumee Bay, Ohio 148, 153
Maumee, Ohio 149
Maurice River, N. J 85
Mayflower, tender, Second district 56
Mayo Beach, Mass 48
McGulpin Point, Mich 131
Meadows post light, Conn 60
Members Light-House Board, June 30, 1897 3
    changes during fiscal year 5
    executive members 3
Mendota, Mich 160
Menominee Pierhead., Mich 137
Mermenteau River, La 37, 127
Michigan City, Ind 37, 134
Michigan Island, Wis 161
Middle Island, Mich 38, 155
Middle Neebish Cut Range, Mich 157
Millis, John, Captain, Corps of Engineers, U. S. A 3, 197
Milwaukee Pierhead, Wis 134, 140
Milwaukee, Wis 134
Mispillion Creek, Del 84
Mission Point, Mich 132
Mistletoe, tender, Third district 57, 81
Mobile Point, Ala 125
Mobile Ship Channel, Ala 125
Mohegan Dike post light, Conn 59
Montauk Point, N. Y 59, 69
Mouse Island post lights, Conn 60

	Page.
Mud Lake, Mich	38, 157
Murderkill Creek, Del	85
Myrtle, tender, First and Second districts	39, 47, 56

N.

Nantucket Shoals light-vessel, No. 66, Mass	51, 53
Narragaugus, Me	36, 40
Navesink, N. J	62
Negro Island, Me	41
Nettle, launch, Third district	37, 82
Newburyport Harbor, Mass	47
Newcastle Range, Del	86
New Dungeness, Wash	38, 184, 188
New Haven Harbor Breakwater, Conn	26, 37, 60
New London depot, Conn	78
New London Harbor, Conn	59, 69
New York Slough, Cal	38, 173
Ninth district, officers in charge of	4, 131
statistics of	131
Northeast End light-vessel, No. 44, N. J	88, 90
North Head, Wash	183
North Manitou, Mich	132, 139
Northwest Point Royal Shoal, N. C	100
Norwalk Harbor, Conn	37, 61

O.

Oakland Harbor, Cal	173
Oak Point, N. Y	38, 144
Ocracoke, N. C	99
Officers of Light-House Board	3
Officers in charge of light-house districts, June 30, 1897	3
Oglethorpe Range, Ga	110
Oil houses, new, appropriation asked	35, 36
Tenth district	153
Thirteenth district	189
Oil, lard	77
mineral	77
Old New Haven, Conn	60
Old Orchard Shoal, N. Y	62, 70
Old Plantation Flats, Va	95
Orient Point, N. Y	26
Oswego, N. Y	145
Overfalls Shoal light-vessel, N. J	26, 90
Owls Head, Me	41
Oyster Bayou, La	37, 127
Oyster Pond, N. Y	60

P.

Pansy, tender, Eighth district	124, 129
Passage Island, Mich	162, 165
Pearl River, Miss	125
Pecks Ledge, Conn	37
Pemaquid Point, Me	43
Pensacola depot, Fla	121

Page.
Pensacola, Fla 119
Perche Rock post light, Conn 59
Perkins Island, Me 42
Personnel of Board, changes 5
  district officers, changes 5
Pharos, tender, Sixth district 108, 115
Pigeon Point, Cal 38, 171, 177
Plum Beach, R. I 37, 58
Plum Island Range, Wis 135, 140
Poe Reef light-vessel, No. 62, Mich 38, 163, 164
Point Arena, Cal 173, 177
Point Arguello, Cal 38, 170
Point Betsey, Mich 132, 139
Point Brown, Wash 38, 185
Point Buchon, Cal 38, 170
Point Comfort Beacon, N. J 62
Point Conception, Cal 170, 176
Point Hueneme, Cal 38, 169
Point Iroquois, Mich 158, 165
Point Loma, Cal 169
Point Lookout, Md 105
Point Montara, Cal 171, 177
Point No Point, Wash 38, 185, 188
Point Pinos, Cal 38, 171
Point Sur, Cal 38, 170, 177
Pointe aux Barques, Mich 37, 136, 155
Pollock Rip, Mass 36, 49
Pollock Rip light-vessel, No. 47, Mass 50, 53
Pond Island, Me 42
Pony Bend, Oreg 182
Pooles Island, Md 99
Portage Lake, Mich 38, 133
Portage Lake Ship Canals, Mich 160, 165
Portage Lake and River lights, Mich 159
Portage Range, Mich 159
Port Austin Reef, Mich 155, 164
Port Clinton, Ohio 148
Port Eads, La., depot 129
Port Jefferson East Breakwater Beacon, N. Y 60
Port Jefferson West Beacon, N. Y 61
Port Penn Range, Del 85, 86
Port Ponchartrain, La 126
Portsmouth Harbor, N. H 43
Portsmouth, Va 105
Post lights, number of 7
  Third district 57
  Fourth district 83
  Fifth district 94, 104
  Sixth district 108
  Eighth district 124
  Eleventh district 154
  Twelfth district 169
  Thirteenth district 181, 186
  Fourteenth district 190
  Fifteenth district 192

Page.

Post lights Sixteenth district 195
Presque Isle, Mich 155, 164
Presqu'ile, Pa 146
Press Barn Bar post lights, Conn 60
Prospect Harbor, Me 40
Prudence Island, R. I 57

Q.

Quarry Point, Cal 38, 173

R.

Race Rock, N. Y 59, 69
Ragged Point, Va 37, 96
Ram Island, Me 42
Ram Island Reef light-vessel, No. 23, N. Y 65
Rappahannock River, Va 37, 95
Recommendations relative to improvement of existing aids to navigation 28, 29
Red Fish Bar, Tex 37, 128
Reeds Point, N. C 99
Reedy Island, Del 86
Reimbursement of losses of seamen in the Fourth district 37, 90
light-keepers in the Sixth district 37, 112
Eighth district 37, 128
Relief light-vessel for Fourth district 37, 89
Fifth district 37, 103
Twelfth and Thirteenth districts 38, 175, 187
Relief light-vessels (*See* Light-vessels).
Repairs and incidental expenses, appropriation asked 27, 36
Repairs of light-houses in First district 43
Second district 49
Third district 64
Fourth district 88
Fifth district 101
Sixth district 112
Seventh district 120
Eighth district 128
Ninth district 138
Tenth district 150
Eleventh district 163
Twelfth district 175
Thirteenth district 186
Rivers, appropriation for lighting asked 33, 36
number of laborers in charge of lights on 7
post lights on 7
Roanoke marshes, N. C 100
Roanoke River, N. C 100
Robinson Point, Wash 38, 185, 188
Rock Island depot, N. Y 152
Rockland Lake, N. Y 63
Rock of Ages, Mich 38, 162
Roe Island, Cal 173
Rondout, N. Y 63
Rose, tender, Third district 57, 82
Round Island, Mich 156, 164
Russell Island, Mich 155

S.

Page.
Saginaw River Range, Mich 155
St. Catherine Sound, Ga 111
St. George Reef, Cal 175, 177
St. Johns River, Fla., entrance beacons 111, 112
St. Jones Creek, Del 85
St. Joseph, Mich 142
St. Joseph Pierhead Range, Mich 133, 140
St. Joseph Point, Fla 37, 119
St. Martin Island, Mich 37, 136
St. Simon Range, Ga 111
Salaries of light-keepers, appropriation made 1897-98 .... 26, 30
  asked 1898-99 .... 30, 36
Salem Creek, N. J 86
Sand Beach Harbor of Refuge, Mich 155, 164
Sand Island, Ala 37, 124
Sand Key, Fla 118
Sandusky Bay Range, Ohio 147
Sandusky, Ohio 153
Sandy Hook light-vessel, No. 51, N. Y 66, 70
Sandy Neck, Mass 48
San Francisco Harbor light-vessel, No. 70, Cal 26, 175
Sanibel Island, Fla 118
Sankaty Head, Mass 37, 49
Santa Barbara, Cal 38, 169
Sassafras Point, R. I 58
Schley, W. S., Captain, U. S. Navy 3, 5, 197
Schodack Channel post light, N. Y 64
Schooner Ledge range, Pa 87
Schuylkill, Pa 87
Scotch Cap post light, Conn 59
Scotland light-vessel, No. 7, N. Y 66
Sea Girt, N. J 83
Second district, officers in charge of 3, 47
  statistics of 47
Seguin, Me 42, 45
Semiahmoo, Wash 38, 186
Seven Foot Knoll, Md 99
Seventh district, officers in charge of 4, 117
  statistics of 117
Sharpie, Fifth district 94
Ship Island, Miss 125
Ship Shoal, La 127
Shovelful Shoal light-vessel, No. 3, Mass 50
Shutes Folly Island Spit Beacon, S. C 110
Simmons Reef light-vessel, No. 55, Mich 138, 139
Sixteenth district, officers in charge of 4, 195
  statistics of 195
Sixth district, officers in charge of 4, 108
  statistics of 108
Skillegallee, Mich 131, 139
Slip Point, Wash 38, 184
Smith Point light-vessel, No. 46, Va 102, 104
Smith Point, Va 95
Snowdrop, launch, Sixth district 108, 116

Page.
Sombrero Key, Fla 118
South Bass Island, Ohio 148
South Fox Island, Mich 132, 139
South Hook (Sandy Hook) Beacon, N. J 62
South Manitou, Mich 132, 139
South Milwaukee, Wis 37, 134
South Pass light-vessel No. 43, La 128, 129
Southwest Ledge, Conn 60, 69
Southwest Pass, La 126
Southwest Reef, La 127
Special works, appropriation for, 1897–98 ..... 26, 27
    estimates for, 1898–99 36
Spectacle Island, Mass 48, 164
Spring Point Ledge, Me 43
Squaw Point, Mich 137
Squirrel Point, Me 42
State Ledge, Mass 36, 48
Staten Island depot, N. Y 26, 37, 73
Stepping Stones, N. Y 61
Stockport post light, N. Y 63
Stony Point, N. Y 145
Stratford Shoal, N. Y 60, 69
Sturgeon Bay Canal, Wis 135, 140
Succonnessett Shoal light-vessel No. 6, Mass 51
Supply steamer 78
Supplies of light-houses, appropriation 1897–98 ..... 26, 27
    asked for 1898–99 ..... 27, 36

T.

Tail Point, Wis 37, 137
Tarrytown, N. Y 63
Tawas, Mich 155
Temporary changes in aids to navigation 18
Tender for Second district, *Mayflower* 26, 56
    Third district, Inspector 37, 81
    Third district, Engineer 37, 81
    Fourth district, Engineer 93
    Seventh and Eighth districts, *Mangrove* 26, 122, 130
    Ninth district 38, 142
    Tenth district 38, 153
Tenders, First district, *Geranium, Lilac, Myrtle* 39, 45
    Second district, *Azalea, Geranium, Mayflower, Myrtle, Verbena* 47, 54
    Third district, *Armeria, Cactus, Daisy, Gardenia, John Rodgers, Mistletoe, Nettle, Rose* 57, 78
    Fourth district, *Leal, Zizania* 83, 92
    Fifth district, *Bramble, Jessamine, Maple, Thistle, Violet,* and a sharpie 94, 105
    Sixth district, *Pharos, Snowdrop, Water Lily, Wistaria* 108, 115
    Seventh district, *Arbutus, Clover, Laurel, Mangrove* 117, 122
    Eighth district, *Arbutus, Clover, Pansy* 124, 129
    Ninth district, *Amaranth, Dahlia, Lotus, Warrington* 131, 142
    Tenth district, *Haze* 144, 153
    Eleventh district, *Amaranth, Lotus, Marigold, Warrington* 154, 167
    Twelfth district, *Hazel, Madroño* 169, 179
    Thirteenth district, *Columbine, Manzanita* 181, 189

Page.

Tenders, Fourteenth district, *Goldenrod* 190, 191
  Fifteenth district, *Lily* 192, 193
  Sixteenth district, *Joseph Henry* 195
  number in service 7
  new, appropriations asked 33, 37, 38
Tennessee Centennial Exposition 34
Tenth district, officers in charge of 4, 144
  statistics of 144
Terra Ceia Bay, Fla 37, 118
The Sisters, Me 36, 44
Third district, officers in charge of 3, 57
  statistics of 57
Thirteenth district, officers in charge of 4, 181
  statistics of 181
Thistle, tender, Fifth district 94, 107
Thunder Bay Island, Mich 155, 164
Tibbetts Point, N. Y 145, 151
Tillamook Rock, Oreg 182, 187
Tinicum Island, N. J 87
Toledo Harbor, Ohio 38, 149
Tompkinsville, N. Y., General Light-House Depot 26, 73
Tongue Point depot, Oreg 38, 188
Tortugas Harbor depot, Fla 121
Tucker Beach, N. J 83
Turkey Point, Md 99
Twelfth district, officers in charge of 4, 169
  statistics of 169
Two Bush Island, Me 41
Two Harbors, Minn 161, 165
Tybee Knoll Cut range, Ga 110

U.

Umatilla Reef light-vessel No. 67, Wash 187
Upper Cedar Point, Md 97
Upper Green Spring, N. C 100

V.

Venus Point, S. C 110
Verbena, tender, Second district 47, 55
Vermilion, Ohio 147
Vineyard Sound light-vessel No. 41, Mass 51, 54
Violet, tender, Fifth district 94, 106

W.

Wade Point, N. C 99
Warrington, tender, Ninth district 131, 154, 168
Watch Hill, R. I 58
Water Lily, launch, Sixth district 108, 116
Waugoshance, Mich 131, 139
West Point, Wash 185, 188
West Bank, N. Y 26, 62
Whale Rock, R. I 58
Whistling buoys in position (*see* Buoys) 7, 25
  established and discontinued during fiscal year 17–24
  First district 39

Page.
Whistling buoys Second district 47
    Third district 57
    Fourth district 83
    Fifth district 94
    Sixth district 108
    Seventh district 117
    Eighth district 121
    Twelfth district 169, 178
    Thirteenth district 181
Whitefish Point, Mich 158, 165
Whitehead depot, Me 45
Whitehead, Me 36, 41, 44
White Shoal light-vessel No. 56, Mich 138, 139
Whitestone Point post light, N. Y 61
Whitlocks Mill, Me 36, 39
Wilde, George F. F., Commander, U. S. N 3, 197
Windmill Point, Mich 154
Wind Point, Wis 134, 140
Winter Quarter Shoal light-vessel No. 45, Va 89, 91
Wistaria, tender, Sixth district 108, 115
Woods Hole depot, Mass 54
Works authorized, no appropriation made 26, 27

Y.

Yerba Buena, Cal 173, 177
Yerba Buena Island, Cal 179
York Spit, Va 95

Z.

Zizania, tender, Fourth district 83, 92